

TP-225L
June 11, 2001

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 225

Child Restraint Anchorage Systems
Lower Anchorages



SAFETY ASSURANCE
Office of Vehicle Safety Compliance
Room 6115, NSA-30
400 Seventh Street, SW
Washington, D.C. 20590

OVSC LABORATORY TEST PROCEDURE NO. 225L
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1. PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contractor laboratories with Laboratory Test Procedures as guidelines for obtaining compliance test data. The data are used to determine if a specific vehicle or item of motor vehicle equipment meets the minimum performance requirements of the subject Federal Motor Vehicle Safety Standard (FMVSS). The purpose of the OVSC Laboratory Test Procedures is to present a uniform testing and data recording format, and provide suggestions for the use of specific equipment and procedures. If any contractor views any part of an OVSC Laboratory Test Procedure to be in conflict with a Federal Motor Vehicle Safety Standard (FMVSS) or observes deficiencies in a Laboratory Test Procedure, the contractor is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

Every contractor is required to submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure must include a step-by-step description of the methodology to be used. The contractor's test procedure shall contain a complete listing of test equipment with make and model number and a detailed check-off sheet. The list of test equipment shall include instrument accuracy and calibration dates. All equipment shall be calibrated in accordance with the manufacturer's instructions. There shall be no contradictions between the Laboratory Test Procedure and the contractor's in-house test procedure. Written approval of the in-house test procedures shall be obtained from the COTR before initiating the compliance test program. The OVSC Laboratory Test Procedures are not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment which will assist in procuring the required compliance test data. These Laboratory Test Procedures do not constitute an endorsement or recommendation for use of any product or method. However, the application of any such testing technique or equipment is subject to prior approval of the COTR.

NOTE: The OVSC Laboratory Test Procedures, prepared for the limited purpose of use by independent laboratories under contract to conduct compliance tests for the OVSC, are not rules, regulations or NHTSA interpretations regarding the meaning of a FMVSS. The Laboratory Test Procedures are not intended to limit the requirements of the applicable FMVSS(s). In some cases, the OVSC Laboratory Test Procedures do not include all of the various FMVSS minimum performance requirements. Recognizing applicable test tolerances, the Laboratory Test Procedures may specify test conditions that are less severe than the minimum requirements of the standard. In addition, the Laboratory Test Procedures may be modified by the OVSC at any time without notice, and the COTR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the standard itself and within the scope of the contract. Laboratory Test Procedures may not be relied upon to create any right or benefit in any person. Therefore, compliance of a vehicle or item of motor vehicle equipment is not necessarily guaranteed if the manufacturer limits its certification tests to those described in the OVSC Laboratory Test Procedures.

2. GENERAL REQUIREMENTS

FMVSS 225 establishes requirements for child restraint anchorage systems to ensure their proper location and strength for the effective securing of child restraints, to reduce the likelihood of their failure, and to increase the likelihood that child restraints are properly secured and thus more fully achieve their potential effectiveness in motor vehicles. The standard applies to passenger cars; to trucks and multipurpose passenger vehicles with a gross vehicle weight rating (GVWR) of 3,855 kilograms (8,500 pounds) or less, except walk-in van-type vehicles and vehicles manufactured to be sold exclusively to the U.S. Postal Service; and to buses (including school buses) with a GVWR of 4,536 kg (10,000 lb) or less, except shuttle buses. Voluntarily installed child restraint anchorage systems are required to comply with the requirements of FMVSS 225.

NOTE. Section number inside parenthesis indicates the corresponding referenced in the standard, i.e. (S4.2).

2-1 NUMBER OF LOWER ANCHORAGES

Table 1. Index for Number of Anchorages

Manufactured Year	Illustration
Vehicles manufactured on or after September 1, 2000 and before September 1, 2002. (<u>A specified percentage of each manufacturer's yearly production</u> (as set forth in FMVSS 225, S14).)	Table 2
Vehicles manufactured on or after September 1, 2002	Table 3

Table 2. Number of The Required Lower Anchorages
(Minimum requirement)

Seating Row	Illustration of Seating System Configurations										
	Case 1 ⁷	Case 2	Case 3	Case 4	Case 5 ⁵	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11 ⁷
First	3	"	"	"	"	"	"	" "	" "	" "	3"
Second	W	33	33"	3	" 3	33	" 3"	33"	33	" 33	W
Third	W	W	W	3"	" 3"	" " "	3" "	W	W	W	W

NOTE:

1. denotes driver seat.
2. " denotes designated forward-facing seating positions without the lower anchorages.
3. 3 denotes designated forward-facing seating positions with the required lower anchorages.
4. W denotes no designated seating positions.

5. In a vehicle with three or more rows of seating positions, at least one of the lower anchorages shall be installed at a forward-facing seating position in the second row if such a forward-facing seating position is available in that row.
6. A vehicle that does not have an air bag on-off switch shall not have any child restraint system installed at a front designated seating position.
7. A vehicle that does not have a rear designated seating position and has an air bag on-off switch (see FMVSS 208) shall have a child restraint anchorage system (including lower anchorages) in the front seat, instead of only a tether anchorages. (S5(d) In the case of convertibles, the front DSP need have only the lower anchorages.

Table 3. Number of The Required Lower Anchorages
(Minimum requirement)

Seating Row	Illustration of Seating System Configurations										
	Case 1 ⁷	Case 2	Case 3	Case 4	Case 5 ⁵	Case 6	Case 7 ⁵	Case 8	Case 9	Case 10	Case 11 ⁷
First	3	"	"	"	"	"	"	" "	" "	" "	3"
Second	W	33	33"	3	" 3	33	" 3"	33"	33	" 33	W
Third	W	W	W	3"	" 3"	" " "	3" "	W	W	W	W

NOTE:

1. denotes driver seat.
2. " denotes designated forward-facing seating positions without the lower anchorages.
3. 3 denotes designated forward-facing seating positions with the required lower anchorages.
4. Wdenotes no designated seating positions.
5. In a vehicle with three or more rows of seating positions, at least one of the lower anchorages shall be installed at a forward-facing seating position in the second row if such a forward-facing seating position is available in that row.
6. A vehicle that does not have an air bag on-off switch shall not have any child restraint system installed at a front designated seating position.
7. A vehicle that does not have a rear designated seating position and has an air bag on-off switch (see FMVSS 208) shall have a child restraint anchorage system (including lower anchorages) in the front seat, instead of only a tether anchorages. (S5(d) In the case of convertibles, the front DSP need have only the lower anchorages.

2-2. Configuration of Lower Anchorages

Table 4. Index for Configuration of Lower Anchorages

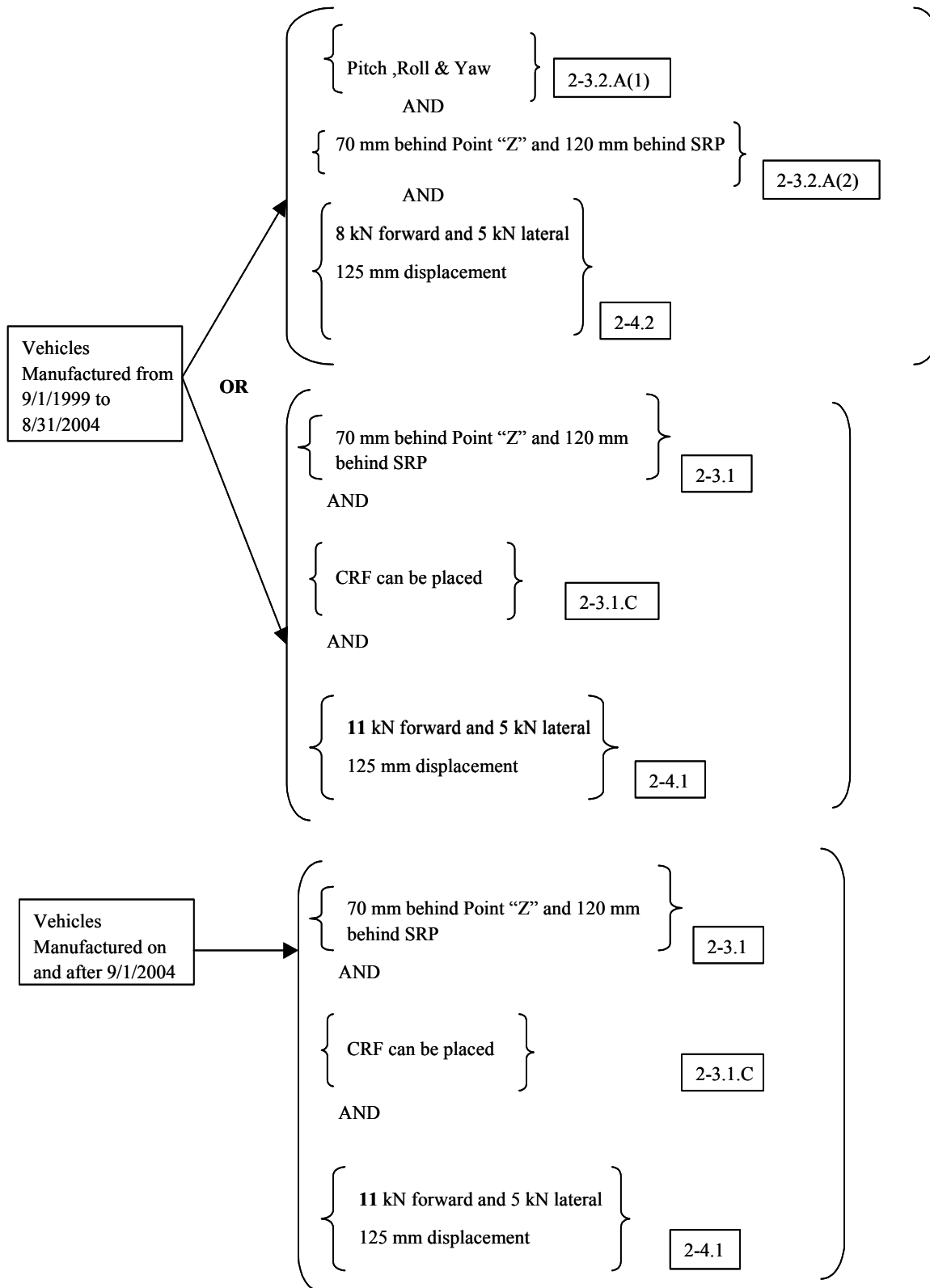
Manufactured Year	Remark	Applicable TP Sections
Vehicles manufactured on and after September 1, 2004	N/A	2-2.1
Vehicles manufactured from September 1, 1999 to August 31, 2004	at the manufacturer's option	2-2.1 or 2-2.2

1. **(S9.1.1)** Lower Anchorages: The lower anchorages shall consist of two bars that:
 - A. Are 6 ± 1 mm in diameter;
 - B. Are straight, horizontal and transverse with the vehicle, and whose centroidal longitudinal axes are collinear;
 - C. Are not less than 25 mm, but not more than 40 mm in length;
 - D. Can be connected to, over their entire by the connectors of a child restraint system;
 - E. Are 280 ± 1 mm apart, measured from the center of the length of one bar to the center of the length of the other bar;
 - F. Are an integral and permanent part of the vehicle or vehicle seat; and
 - G. Are rigidly attached to the vehicle such that they will not deform more than 5 mm when subjected to a 100 N force in any direction.

2. **(S9) As an alternative**, a vehicle manufactured from September 1, 1999 to August 31, 2004 may, at the manufacturer's option, meet the following:
 - A. **(15.1.2.1)** The lower anchorage shall consist of two bars that - -
 1. Are $6 \text{ mm} \pm 1$ in diameter;
 2. Are straight, horizontal and transverse with the vehicle;
 3. Are not less than 25 mm in length; and
 4. Are permanently attached to the vehicle or vehicle seat such that they can only be removed by use of a tool such as a screwdriver or wrench.

Lower Anchorage Location and Strength Requirements

5



Note: Section in the box indicates the corresponding section the TP

2-3. Location of Lower Anchorages

Table 5. Index for Location of Lower Anchorages

Manufactured Year	Remark	Applicable TP Sections
Vehicles manufactured on and after September 1, 2004	N/A	2-3.1
Vehicles manufactured from September 1, 1999 to August 31, 2004	at the manufacturer's option	2-3.1 or 2-3.2

2-3.1. **(S9.2)** Lower Anchorages. With adjustable seats adjusted such that the seat backs are in the manufacturer's normal design riding position in the manner specified by the manufacturer; and the seats are in the full rearward and full downward position, each lower anchorage bar shall be located so that a vertical transverse plane tangent to the front surface of the bar is:

- A. Not more than **70 mm** behind the corresponding Point “Z” of the CRF (see definitions on page 19), measured parallel to the bottom surface of the CRF and in a vertical longitudinal plane, while the CRF is pressed against the seat back by the rearward application of a horizontal force of 5 N at Point “A” on the CRF (see 12-3.2.2); and
- B. Not less than **120 mm** behind the vehicle seating reference point (SRP), measured horizontally and in a vertical longitudinal plane (see 12-3.2.2).
- C. **(S9.3)** Adequate fit of the lower anchorages. Each vehicle and each child restraint anchorage system in that vehicle shall be designed such that the CRF can be placed inside the vehicle and attached to the lower anchorages of each child restraint anchorage system, with adjustable seats adjusted as described in (1) and (2) below:
 - (1) Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer; and
 - (2) Place adjustable seats in the full reward and full downward position.

NOTE: To facilitate installation of the CRF in a vehicle seat, the modified CRF, as shown in Figure 1A, may be used.

2-3.2. **(S15))** Lower Anchorages. **As an alternative**, a vehicle manufactured from September 1, 1999 to August 31, 2004 may, at the manufacturer's option, meet the following:

A. **(15.1.2.2)** installation:

- (1) With the CRF attached to the lower anchorages and resting on the seat cushion, the bottom surface shall have attitude angle within the limits in the following table, and angles measured relative to the vehicle horizontal, longitudinal and transverse reference planes (see Table 6 and Figure 1).

Table 6. Requirements for Pitch, Roll, and Yaw

Pitch	15±10 degrees
Roll	0±5 degrees
Yaw	0±10 degrees

- (2) **(S15.1.2.2(b)&(c))** With adjustable seats adjusted, as recommended by the vehicle manufacturer for use with the child restraint systems, each lower anchorage bar shall be located so that a vertical transverse plane intersecting the center of the bar is:

- (a) Not more than **70 mm** behind Point “**Z**” of the CRF, measured parallel to the bottom surface of the CRF and to the center of the bar, with the CRF rear surface against the seat back; and
- (b) Not less than **120 mm** behind the vehicle seating reference point (SRP), measured horizontally and to the center of the bar.

NOTE. To facilitate installation of the CRF in a vehicle seat, the modified CRF shown in Figure 1A may be used.

- (c) Adjustable seats are adjusted as recommended by the vehicle manufacturer for use with child restraint systems.

2-4. Strength Requirement for Lower Anchorage

Table 7. Index for Strength Requirement for Lower Anchorages

Manufactured Year	Remark	Applicable TP Sections
Vehicles manufactured on and after September 1, 2004	N/A	2-4.1
Vehicles manufactured from September 1, 1999 to August 31, 2004	at the manufacturer's option	2-4.1 or 2-4.2

1. (S9.4) Lower anchorages

A. (S9.4.1) When test in accordance with section 12 of this procedure, the lower anchorages shall not allow Point “X” on SFAD 2 to be displaced horizontally more than 125 mm, after preloading the device, when:

- (1) A force of 11,000 N is applied in a forward direction in a vertical longitudinal plane that is parallel within ± 5 degrees to the vehicle's longitudinal centerline. (S9.4.1.1) The initial forward force shall be applied within 10 ± 5 degrees above the horizontal plane; and
- (2) A force of 5,000 N is applied in a lateral direction in a vertical longitudinal plane that is 75 ± 5 degrees to either side of a vertical longitudinal plane that is parallel to the vehicle's longitudinal centerline. (S9.4.1.1) The initial lateral force shall be applied within ± 5 degrees above the horizontal plane.

B. (S9.4.2) Provision for simultaneous and sequential testing.

- (1) In the case of vehicle seat assemblies equipped with more than one child restraint anchorage system, the lower anchorage system may, at the agency's option, be tested simultaneously. However, forces may not be applied simultaneously for any two adjacent seating positions whose midpoints are less than 400 mm apart, as measured below:
 - (a) The midpoint of the seating position lies in the vertical longitudinal plane that is equidistance from vertical longitudinal planes through the geometric center of each of the two lower anchorages at the seating position.
 - (b) Measure the distance between the vertical longitudinal planes passing through the midpoints of the adjacent seating positions, as measured along a line perpendicular to the planes.
- (2) The lower anchorages of a particular child restraint anchorage system will not be tested if one or both of the anchorages have been previously tested under this test procedure.

2. **(S15.2) Alternative Lower Anchorages.** As an alternative, a vehicle manufactured from September 1, 1999 to August 31, 2004 may be certified to meet the following static strength requirement:

- A. **(S15.2.1)** If the seat is adjustable, it shall be placed in the position recommended by the vehicle manufacturer for use with the child restraint systems. If no adjustable position is recommended, the seat shall be placed in any position, at the agency's option.
- B. **(S15.2.2)** Horizontal excursion of Point "X" during application of the 8,000 N and 5,000 N forces shall be not more than 125 mm, after preloading the device.

2-5 **(S9.5) Marking and Conspicuity of the lower anchorages:**

1. Each vehicle shall comply with FMVSS S9.5(a) or (b), such that:
 - A. **(S9.5(a))** Above each bar installed, the vehicle shall be permanently marked with a circle:
 - (1) That is not less than 13 mm in diameter;
 - (2) Whose color contrast with its background; and
 - (3) That is located on each seat such that its center is not less than 50 mm and not more than 75 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar; or
 - B. **(S9.5(b))** The vehicle shall be configured such that each of the bars installed is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical longitudinal plane passing through the center of the bar, along a line making an upward 30 degree angle with a horizontal plane.
2. **(S15.4) Alternative Lower Anchorages.** As an alternative, a vehicle manufactured from September 1, 1999 to August 31, 2004 may be certified to meet the following marking and conspicuity requirements:
 - A. at least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking feature shall be readily visible to person installing a CRF.
 - B. If guidance fixtures are used, the fixture(s) (although removable) must be installed.
 - C. Storable anchorages shall be provided with a telltale or label that is visible when the anchorage is stored.

2-6 General Exceptions

1. Built-in child restraint system: A vehicle may be equipped with a built-in child restraint system conforming to the requirements of Standard No. 213 (49 CFR 571.213) instead of one of the required tether anchorages or child restraint anchorage systems.
2. Each vehicle that-
 - A. Does not have a rear designated seating position and that thus meets the conditions in S4.5.4.1(a) of Standard No. 208 (§571.208); and
 - B. Has an air bag on-off switch meeting the requirements of S4.5.4 of Standard No. 208, shall have a child restraint anchorage system for a designated passenger seating position in the front seat, instead of a tether anchorage that is required for a front passenger seating position.
 - C. For vehicles manufactured on or after September 1, 2002, each vehicle that does not have a rear designated seating position, and does not have an air bag installed at front passenger designated seating positions pursuant to a temporary exemption granted by NHTSA under 49 CFR Part 555, must have a child restraint anchorage system installed at a front passenger designated seating position. In the case of convertibles, the front designated passenger seating position need have only the two lower anchorages meeting the requirements of the lower anchorage of the child restraint anchorage system.
3. Each vehicle that-
 - A. Has a rear designated seating position and meets the conditions in S4.5.4.1(a) of Standard No. 208 (571.208); and
 - B. Has an air bag on-off switch meeting the requirements of S4.5.4 of Standard 208, shall have a child restraint anchorage system for a designated passenger seating position in the front seat, instead of a child restraint anchorage system that is required for the rear seat.
 - C. For vehicles manufactured on or after September 1, 2002, each vehicle that has a rear designated seating position and meets the conditions in S4.5.4.1(b) of Standard No. 208, and does not have an air bag installed at front passenger designated seating positions pursuant to a temporary exemption granted by NHTSA under 49 CFR Part 555, must have a child restraint anchorage system installed at a front passenger designated seating position in place of one of the child anchorage systems that is required for the rear seat. In the case of convertibles, the front designated passenger seating position need have only the two lower anchorages meeting the requirements of the lower anchorage of the child restraint anchorage system.
4. Air bag on-off switch: A vehicle that does not have an air bag on-off switch meeting the requirements of S4.5.4 of Standard No. 208 (571.208), shall not have any child restraint anchorage system installed at a front designated seating position.

5. A vehicle with a rear designated seating position for which interference with transmission and/or suspension components prevents the location of the lower bars of a child restraint anchorage system anywhere within the required zone such that the attitude angles (see 2-3.2.A(1) of this procedure) could be met, is excluded from the requirement to provide a child restraint anchorage system at that position.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test vehicles from unauthorized personnel during the entire compliance testing program. The contractor is financially responsible for any acts of theft and/or vandalism which occur during the storage of test vehicles. Any security problems which arise shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours. The contractor shall protect and segregate the data that evolves from compliance testing before and after each vehicle test. No information concerning the vehicle safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Branch Chief or Division Chief.

NOTE: NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL DIRECTLY INVOLVED IN THE COMPLIANCE TESTING PROGRAM, SHALL BE ALLOWED TO WITNESS ANY VEHICLE COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COTR.

4. GOOD HOUSEKEEPING

Contractors shall maintain the entire vehicle compliance testing area, test fixtures and instrumentation in a neat, clean and painted condition with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

5. TEST SCHEDULING AND MONITORING

The contractor shall submit a vehicle test schedule to the COTR prior to conducting the first compliance test. Tests shall be completed as required in the contract. Scheduling shall be adjusted to permit vehicles to be tested to other FMVSSs as may be required by the OVSC. All compliance testing shall be coordinated with the COTR in order to allow monitoring by the COTR or other OVSC personnel.

6. TEST DATA DISPOSITION

The contractor shall make all preliminary compliance test data available to OVSC within four hours after the test, if requested. Final test data, including digital printouts and computer generated plots (if applicable), shall be furnished to the COTR within 5 working days. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR. All backup data sheets, strip charts, recordings, plots, technician's notes etc., shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc. Calibration information shall not be destroyed.

7. GOVERNMENT FURNISHED PROPERTY (GFP)

ACCEPTANCE OF VEHICLE

The Contractor has the responsibility of accepting the test vehicle from either a new car dealer or a vehicle transporter. In both instances, the contractor acts in the OVSC's behalf when signing an acceptance of the test vehicle. If the vehicle is delivered by a dealer, the engineer must check to verify the following:

- A. All options listed on the "window sticker" are present on the test vehicle.
- B. Tires and wheel rims are new and the same as listed.
- C. There are no dents or other interior or exterior flaws.
- D. The vehicle has been properly prepared and is in running condition.
- E. The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys.
- F. Proper fuel filler cap is supplied on the test vehicle.

If the test vehicle is delivered by a government contracted transporter, the contractor's test engineer shall check for damage which may have occurred during transit.

A "Report Of Vehicle Condition At The Completion Of Testing" form (shown on the next page) will be supplied to the contractor by the COTR when the test vehicle is transferred from the new car dealer or between test contracts. The upper half of the form describes the vehicle in detail, and the lower half provides space for a detailed description of the post test condition. This form must be returned to the COTR with the copies of the Final Test Report or the reports will NOT be accepted.

NOTIFICATION OF COTR

The COTR must be notified within 24 hours after a test vehicle has been delivered.

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT NO.: DTNH22-_____ DATE: _____

FROM: _____

TO: _____

The following vehicle has been subjected to compliance testing for FMVSS No. _____

The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager (NAD-30), with a copy to the OVSC COTR. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

MODEL YEAR/MAKE/MODEL/BODY STYLE: _____

NHTSA NO.: _____ BODY COLOR: _____ VIN: _____

ODOMETER READINGS: ARRIVAL - _____ miles DATE - _____

COMPLETION - _____ miles DATE - _____

PURCHASE PRICE: \$ _____ DEALER'S NAME: _____

ENGINE DATA: _____ Cylinders _____ Liters _____ Cubic Inches

TRANSMISSION DATA: _____ Automatic _____ Manual _____ No. of Speeds

FINAL DRIVE DATA: _____ Rear Drive _____ Front Drive _____ 4 Wheel Drive

TIRE DATA: Size - _____ Mfr. - _____

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

<input type="checkbox"/>	Air Conditioning	<input type="checkbox"/>	Traction Control	<input type="checkbox"/>	Clock
<input type="checkbox"/>	Tinted Glass	<input type="checkbox"/>	All Wheel Drive	<input type="checkbox"/>	Roof Rack
<input type="checkbox"/>	Power Steering	<input type="checkbox"/>	Speed Control	<input type="checkbox"/>	Console
<input type="checkbox"/>	Power Windows	<input type="checkbox"/>	Rear Window Defroster	<input type="checkbox"/>	Driver Air Bag
<input type="checkbox"/>	Power Door Locks	<input type="checkbox"/>	Sun Roof or T-Top	<input type="checkbox"/>	Passenger Air Bag
<input type="checkbox"/>	Power Seat(s)	<input type="checkbox"/>	Tachometer	<input type="checkbox"/>	Front Disc Brakes
<input type="checkbox"/>	Power Brakes	<input type="checkbox"/>	Tilt Steering Wheel	<input type="checkbox"/>	Rear Disc Brakes
<input type="checkbox"/>	Antilock Brake System	<input type="checkbox"/>	AM/FM/Cassette Radio	<input type="checkbox"/>	Other-

LIST OTHER PERTINENT OPTIONAL EQUIPMENT ON NEXT PAGE (REMARKS SECTION)

**REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING
(Continued)**

REMARKS:

Equipment that is no longer on the test vehicle as noted on previous page:

Explanation for equipment removal:

Test Vehicle Condition:

RECORDED BY: _____

DATE: _____

APPROVED BY: _____

8. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the safety compliance test program, a test instrumentation calibration system shall be implemented and maintained in accordance with established calibration practices. Guidelines for setting up and maintaining such calibration systems are described in MIL-C-45662A, "Calibration System Requirements." The calibration system shall be set up and maintained as follows:

- A. Standards for calibrating the measuring and test equipment will be stored and used under appropriate environmental conditions to assure their accuracy and stability.
- B. All measuring instruments and standards shall be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals NOT TO EXCEED SIX (6) MONTHS! Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), shall be maintained for all measuring and test equipment.
- C. All measuring and test equipment and measuring standards will be labeled with the following information:
 - (1) Date of calibration
 - (2) Date of next scheduled calibration
 - (3) Name of company performing calibration service (if different than contractor)
 - (4) Name and employer of the technician who calibrated the equipment
- D. A written calibration procedure shall be provided by the contractor which includes as a minimum the following information for all measurement and test equipment:
 - (1) Type of equipment, manufacturer, model number, etc.
 - (2) Measurement range (see Table 8)
 - (3) Accuracy (see Table 8)
 - (4) Calibration interval

8. CALIBRATION OF TEST INSTRUMENTS (continued)

Table 8. TEST EQUIPMENT ACCURACY

EQUIPMENT	RANGE	ACCURACY
Hydraulic Rams (3 Required, minimum)	0-120% of Specified Load	N/A
Load Cells (3 Required, minimum)	0-120% of Readout Capability	$\pm 0.5\%$
Load Output Recorder	Readout Capability of 3% of Maximum Load	$\pm 1.0\%$
Hydraulic Pump	Approx. 3.8 gpm	N/A
DC Power Supply	Adequate for Load Cells Used	Line Reg. of 0.05% (105 to 125 v) Load Reg. of 0.05% (0 to Full) Ripple: 5 mv P/P Stability: 0.1%
Digital Voltmeter or Equivalent Used to Monitor Load Cell Outputs	4 Digit Readout	$\pm 0.1\%$
Signal Conditioning and Calibration Units	Adequate for Load Cells Used	$\pm 0.5\%$
H-Point Machine	N/A	N/A
Linear Scale	100 mm, Minimum	± 2.0 mm
	Micrometer (for the bar)	± 0.005 mm

(5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)

- E. Records of the calibration for all test instrumentation shall be kept by the contractor in a manner which assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when requested by the COTR. The calibration system shall need the acceptance of the COTR before the test program commences.

- F. Test equipment will receive a calibration check immediately prior to and after the test. This check will be recorded by the test technician(s) and included in the final report.

NOTE: In the event of a failure to the standard's performance requirements, a post test calibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration will be at the COTR's discretion and shall be performed without additional cost.

9. PHOTOGRAPHIC DOCUMENTATION

Photographs, if required, shall be color, 8-1/2 x 11 inches, and properly focused for clear images. A tag, label or placard identifying the test vehicle model, NHTSA number and date or item of equipment part number and date shall appear in each photograph and must be legible. Each photograph shall be labeled as to the subject matter.

As a minimum the following photographs shall be included in each vehicle final test report:

- A. 3/4 frontal right side view.
- B. Test vehicle's certification label.
- C. Test vehicle's tire information placard or label.
- D. 3/4 frontal left side view of test vehicle with test apparatus in place.
- E. 3/4 frontal right side view of test vehicle with test apparatus in place.
- F. Vehicle tie down at each tie down location.
- G. Pretest full front and side views of each child restraint anchorage system installed in the vehicle.
- H. Pretest equipment set up at each designated seating position equipped with child restraint anchorage system.
- I. Load system control and data recording device in test position.
- J. Loading device with load cell and testing device in test position.
- K. Pretest condition of each lower anchorage bar.
- L. Post test condition of each lower anchorage bar.
- M. Any condition which requires special detail.

10. DEFINITIONS

CHILD RESTRAINT ANCHORAGE

Any vehicle component, other than Type I or Type II seat belts, that is involved in transferring loads generated by a child restraint system to the vehicle structure.

CHILD RESTRAINT ANCHORAGE SYSTEM

A vehicle system that is designed for attaching a child restraint system to a vehicle at a particular designated seating position, consisting of:

- (a) Two lower anchorages meeting the requirements of FMVSS 225, S9; and
- (b) A tether anchorage meeting the requirements of FMVSS 225, S6.

CHILD RESTRAINT FIXTURE (CRF)

The fixture depicted in Figures 1 and 2 of this standard that simulates the dimensions of a child restraint system, and that is used to determine the space required by the child restraint system and the location and accessibility of the lower anchorages.

CURB WEIGHT

Weight of the vehicle as delivered with full capacity of vehicle fluids.

DESIGNATED SEATING POSITION (DSP)

Any plan view location capable of accommodating a person at least as large as a 5th percentile adult female, if the overall seat configuration and design and vehicle design is such that the position is likely to be used as a seating position while the vehicle is in motion, except for auxiliary seating accommodations such as temporary or folding jump seats. The number of DSP's in a vehicle is printed on the tire placard as required by FMVSS 110.

INTEGRAL AND PERMANENT PART OF THE VEHICLE - TBD

REAR DESIGNATED SEATING POSITION

Any designated seating position (as that term is defined at §571.3) that is rearward of the front seats(s).

SFAD 2

Static Force Application Device 2 shown in Figures 17 and 18 of this procedure.

STORABLE ANCHORAGE -TBD

TETHER ANCHORAGE

A user-ready, permanently installed vehicle system that transfers loads from a tether strap through the tether hook to the vehicle structure and that accepts a tether hook.

H-POINT

Mechanically hinged hip point of a manikin which simulates the actual pivot center of the human torso and thigh, described in SAE J826.

H-POINT TEMPLATE

For 50th%—

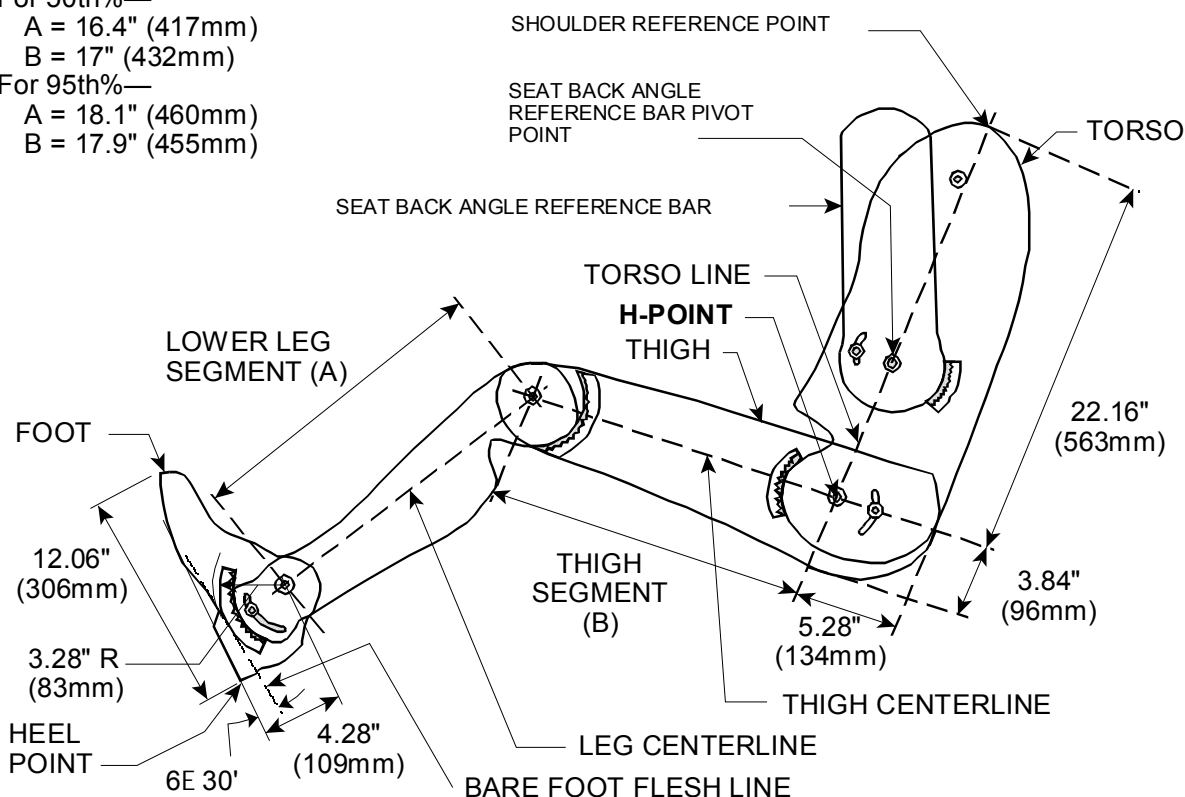
A = 16.4" (417mm)

B = 17" (432mm)

For 95th%—

A = 18.1" (460mm)

B = 17.9" (455mm)



SEATING REFERENCE POINT (SRP)

Manufacturer's Design Reference Point which —

- A . Establishes the rearmost normal design driving or riding position of each DSP in a vehicle
- B . Has coordinates established relative to the designed vehicle structure
- C . Simulates the position of the center pivot of the human torso and thigh
- D . Is the reference point employed to position the two-dimensional templates described in SAE Recommended Practice J826, Manikins for use In Defining Vehicle Seating Accommodation.

TORSO LINE

Line connecting the H-Point and the shoulder reference point (SHRP) as defined in SAE Recommended Practice J383 (of June 95), Motor Vehicle Seat Belt Anchorage.

USER-READY TETHER ANCHORAGE

An anchorage that is accessible without the need for any tools other than a screwdriver or coin, and once accessed, is ready for use without the need for any tools.

11. PRETEST REQUIREMENTS

- 11-1. Prior to conducting any compliance tests, contractors are required to submit a detailed in-house compliance test procedure to the COTR which includes:
 1. A step-by-step description of the methodology to be used. The in-house test procedure will be written in check-off sheet format and will describe each significant task the test technician must perform to accomplish the testing. The check-off list test procedure is intended to provide the test technician(s) with a simple cook book type plan to conduct the test and produce the necessary data. The test procedure shall be of sufficient detail to ensure successful testing.
 2. A written quality control (QC) procedure which shall include calibrations, the data review process, report review, and the people assigned to perform QC on each task.
 3. A complete listing of test equipment which shall include instrument accuracy and calibration dates.
 4. Detailed checkoff lists to be used during the test and during data review.
- 11-2. There shall be no contradiction between the OVSC Laboratory Test Procedure and the contractor's in-house test procedure. The contractor's in-house test procedure shall cover all aspects of testing from vehicle receipt to submission of the Final Report. Written approval must be obtained from the COTR before initiating the compliance test program, unless otherwise directed by the COTR. A compliance test is not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the applicable OVSC Laboratory Test Procedure shall require a retest at the expense of the contractor. The retest costs will include the cost of the replacement vehicle and the service costs for conducting the retest.
- 11-3. RECEIVING INSPECTION OF TEST VEHICLES
 1. A clean and secure test vehicle storage area shall be maintained by the contractor. The test vehicle shall be protected from theft of equipment.
 2. Upon receipt of the test vehicle, it shall be identified by the contractor with a NHTSA number previously furnished by the COTR.

3. The test vehicle's seats, seatbelt restraint systems, and child restraint anchorage system shall be subjected to a visual inspection to ascertain that the child restraint systems, child restraint anchorage system, and the seat belt assembly anchorage systems are complete and the seats and seat belt assemblies are functional. Any damage that could influence the test results shall be recorded on the Vehicle Condition sheet, and any unusual condition shall be reported to the COTR before initiation of testing.
4. The operation of all adjustable seating systems will be checked to ascertain that the systems operate correctly. The results of this inspection shall be recorded on the Receiving-Inspection sheet, data sheet 8, "Test Vehicle Receiving Inspection."

12. COMPLIANCE TEST EXECUTION

12-1. GENERAL STATEMENT OF FMVSS 225 REQUIREMENTS

FMVSS 225 establishes requirements for Child Restraint Anchorage System. Those requirements are detailed in Title 49 Code of Federal Regulations Part 571.225.

12-2. S225 TEST EQUIPMENT DESCRIPTION — The test laboratory is responsible for supplying all of the following equipment.

1. A test loading, monitoring, and control system which shall consist of a minimum of 3 load cells. Force control shall be derived from a closed loop programmable force generator and shall be capable of simultaneously supplying loads to a maximum of 3 separate SFADs at a constant rate. In addition, if any seat belts, belt straps, or lower anchorages fail during the test, the effect on the loading of the remaining anchorages shall not cause those anchorages to exceed the load time, load rate or force requirements of the standard, as the test is completed for those anchorages that did not fail.

Recorded data shall include preload, loading vs time, displacement vs time, and unloading of the anchorages at the end of the hold period.

SFAD 2 is to test the lower anchorages of the child restraint anchorage system at a designated seating position.

If all loading devices are not connected to the same load source, the application rate difference between any of the systems shall not exceed five percent.

The loading apparatus shall be mounted so that it is sturdy enough to adequately withstand the loads applied and so that it will load the SFAD and the belt strap at the required angles.

IT IS IMPORTANT TO NOTE THAT A MAXIMUM OF 3 SEPARATE LOADING DEVICES CAN BE REQUIRED DEPENDENT UPON THE TEST VEHICLE'S CHILD RESTRAINT ANCHORAGE CONFIGURATION, AND A PLOT OF LOAD VERSUS TIME MUST BE GENERATED DURING THE TEST OR FROM REAL TIME CONTINUOUS MEASUREMENTS RECORDED AND STORED DURING THE TEST.

2. Appropriate angle, length, width, height, etc. measuring devices.
3. Restraining device or fixture to completely tie-down and immobilize the S225 test vehicle when applying the required anchorage loads.
4. System to raise and hold the test vehicle at least 25 mm above the floor level.
5. A camera to provide pertinent still photographs, which as a minimum, should include the photographs listed in this procedure.

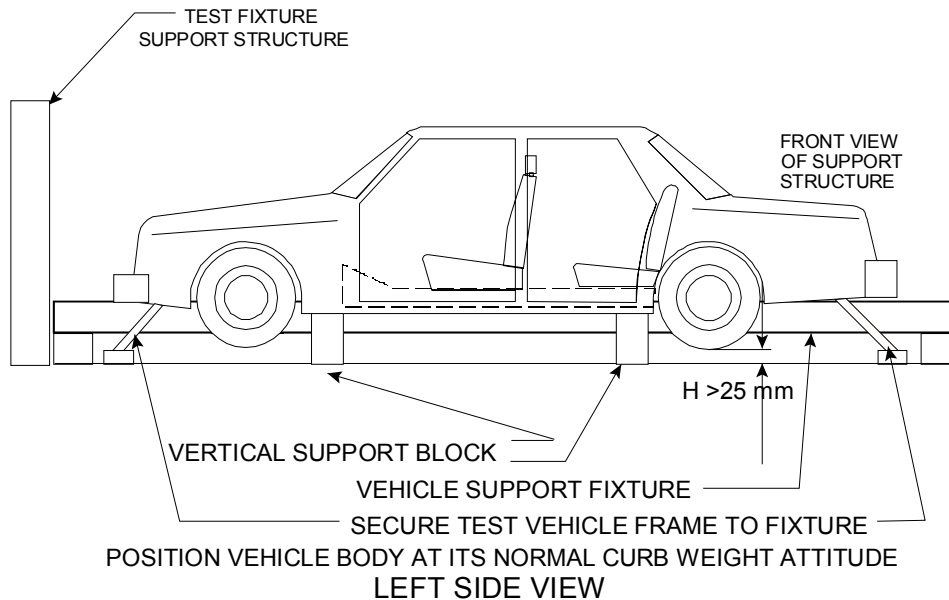


FIGURE A. Typical S225 vehicle test setup

- NOTE 1. The vehicle shall be retained in the position by installing a vertical support or jack between the frame and test area floor close to each wheel.
- NOTE 2. Do not use excessive forces for the tie down. Any tie down force that could influence the test results, by deflecting the vehicle frame, shall not be used.
- NOTE 3. The test vehicle shall be secured to the fixture such that it does not move more than 5 mm during the forward direction force application.
- NOTE 4. The test vehicle must not be restrained by the front or rear bumper systems, movable parts of the suspension, or parts that could influence the test results.

12-3. SEQUENCE FOR LOWER ANCHORAGE SYSTEM TESTS

The test vehicles shall be subjected to the tests in the order shown below:

1. Configuration inspection.
2. Location and Dimensional measurements.
3. Static load testing of lower anchorages.

NOTE: All lower anchorages will be tested starting at the front of the vehicle and progressing to the rear of the vehicle, unless otherwise directed by the COTR.

12-3.1. CONFIGURATION INSPECTION

Perform either 12-3.1.1 or 12-3.1.11, as directed by the COTR.

1. **(S9.5) Marking and configuration.** Perform the following (a) and (b):

- (a) Determine that above each anchorage bar installed, the vehicle is permanently marked with a circle that is not less than 13 mm in diameter; and whose color contrasts with its background; and that is located on each seat such that its center is not less than 50 mm and not more than 75 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.
 - (b) Determine that the vehicle is configured such that each of the bars installed is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical longitudinal plane passing through the center of the bar, along a line marking an upward 30 degree angle with a horizontal plane.
2. Measure the diameter of the bars. Make three measurements at the (lateral) center of the bar, with at least two decimal points (.xx) accuracy. The acceptable range is from 5.85 mm to 6.14 mm.

NOTE. If the anchorage bars interfere, remove the seat back and/or the seat cushion as needed.

3. Determine that the inside straight and horizontal section of the bars are not less than 25 mm, but not more than 40 mm in length. Use the test devices specified in Figure 18A.
4. Determine if the bars can be connected to, over their entire length by the connectors of a child restraint system.
5. Determine if the bars are an integral and permanent part of the vehicle.
6. Determine if the bars are rigidly attached to the vehicle. As part of the inspection, if feasible, hold the bar firmly with two fingers and pull.
7. Record the inspection results on Data Sheet 2.
8. **(S15.4) Optional Marking and Configuration.** If the vehicle is certified with S15.4 of FMVSS 225 by the vehicle manufacturer, use the following procedure (see 2-2.2):

(a) **Marking**

- (1) Verify with the COTR the option used by the manufacturer for certifying the marking and configuration requirements.

- (2) (S15.4) Visually determine if at least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking feature is visible.

NOTE 1. Do not install the CRF.

NOTE 2. The inspection shall be performed in a well illuminated environment.

NOTE 3. The seat cushion and seat back shall not be compressed during the inspection.

- (3) (S15.4) If the anchorages are storable, determine if there is a telltale or label that is visible when the anchorage is stored.

- (4) Record the result on Data Sheet 2.

(b) (S15.1.2) **Configuration**

NOTE. If the anchorage bars interfere, remove the seat back and/or the seat cushion as needed.

- (1) Measure the diameter of the bars. The standard requires 6 ± 1 mm in diameter.
- (2) Determine if the bars are straight, horizontal and transverse.
- (3) Determine if the inside straight and horizontal section of the bars are not less than 25 mm. Use the test device specified in Figure 18A.
- (4) Determine if the bars are permanently attached to the vehicle or vehicle seat such that they can only be removed by use of a tool, such as a screwdriver or wrench.
- (5) Record the results on Data Sheet 2.

12-3.2. LOCATION AND DIMENSIONAL MEASUREMENTS

Perform either 12-3.2.2 or 12-3.2.3, as directed by the COTR.

1. Record the number of Designated Seating Positions (DSPs) specified on the test vehicles' tire information label or placard on Data Sheet 3.
2. Lower Anchorages
 - (1) Record the location of seats that have the lower anchorages on Data Sheet
 - (2) (S9.3) Location of the lower anchorages:
 - (a) If the seat is adjustable, place the adjustable seat back in the manufacturer's nominal design riding position in the manner specified by the manufacturer, (the information will be provided by

the COTR), and place the adjustable seat in the full reward and full downward position.

- (b) Locate the vertical transverse plane tangent to the front surface of the bar (see Figure A1). Cut or remove the seat material as needed.
- (c) Place the CRF inside the vehicle. Attach the CRF to the lower anchorages of each child restraint anchorage system and place against the seat back, without removing any part of the vehicle structure. If the CRF cannot be placed inside the vehicle or if the CRF cannot be attached, record the structural interference.

NOTE 1. If the CRF cannot be placed without the side panels (of the CRF) removed, use the modified CRF, as shown in Figure 1A. Note the CRF used on Data Sheet 3 under “Remarks.”

NOTE 2. If the modified CRF cannot be placed, inform the COTR.

3. Locate point “Z” (see Figure A1 and 2) and point “A” (see Figure #2) on the CRF.
4. Place the CRF **against** the seat back such that it compresses the seat back cushion.
5. Apply a horizontal rearward force (within ± 10 degrees from the horizontal plane) of 5 ± 2 N at point “A” on the CRF. While maintaining the force on point “A,” measure the distance between the point “Z” and the vertical transverse plane tangent to the front surface of the bar. The measurement shall be made parallel to the bottom surface of the CRF and in the vertical longitudinal plane (see Figure A1 and Figure 2).

NOTE 1. If the CRF attachment latches are not retractable, do not attach the lower anchorages. Remove the latch from the CRF, if removable.

NOTE 2. The CRF attachment latches must be retractable.

6. Remove the CRF from the seat.
7. **(S9.2.1(b))** Locate the seating reference point (SRP). The COTR will provide the SRP information.
8. Measure, horizontally and in a vertical longitudinal plane, the distance between the vehicle seating reference point and the vertical transverse plane tangent to the front surface of the bar. Remove the seat cushion and/or the seat back as needed.

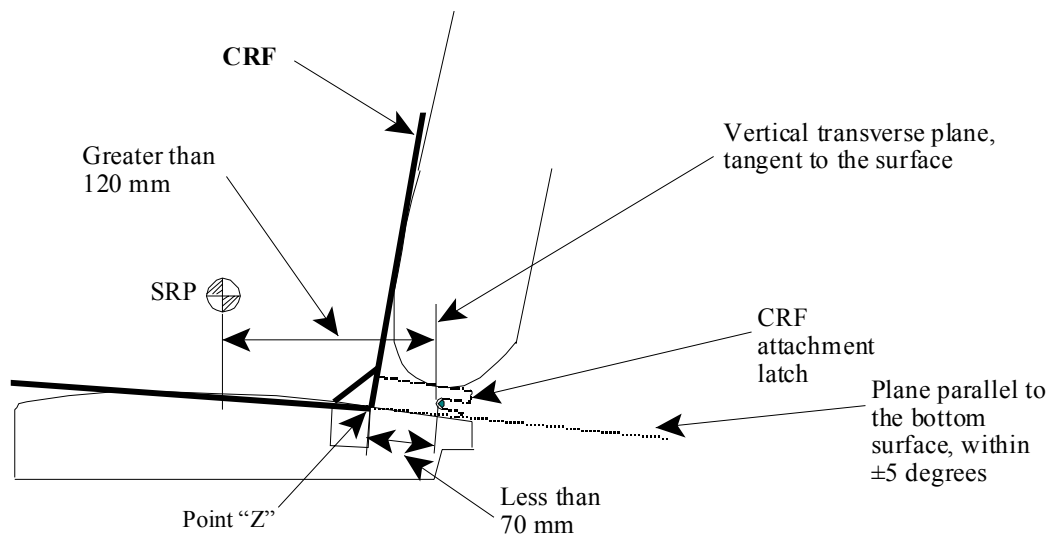


Figure A1. Measurement of the Anchorage Location

9. Record the measurement made on Data Sheet 3.
3. (S15.1) Optional Lower Anchorage Location. If the vehicle is certified with S15.1 of FMVSS 225 by the manufacturer, use the following procedures:
 - (1) Verify with the COTR the option used by the manufacturer for certifying the location requirement.
 - (2) Place the CRF against the vehicle seat back.

NOTE 1. To facilitate installation of the CRF in a vehicle seat, the modified CRF, as shown in Figure 1A, may be used.

NOTE 2. If vehicle components are removed to allow access, the removed parts must be replaced after placing the CRF. If the removed parts cannot be replaced, inform the COTR.
 - (3) If the seat is adjustable, adjust the seat as recommended by the vehicle manufacturer for use with the child restraint system. Attach the CRF to the lower anchorages. Ensure both anchorages are engaged.

NOTE 1. **Do not attach any tether strap.**

NOTE 2. The CRF attachment latches must be retractable.
 - (4) Measure the bottom surface attitude angles relative to the vehicle horizontal, longitudinal and transverse reference planes, as illustrated in Figure 1 (see 2-3.2.A(1)). For the angle measurement, maintain the 70 mm distance for Point “Z” and the latch, as specified in Figure 2.

NOTE 1. Do not apply any force on the CRF during the angle measurement.

NOTE 2. The CRF attachment latches shall be firmly attached to the CRF during the angle measurement.

- (5) Record the measured angles on Data Sheet 3.
- (6) Release the latches from the 70 mm latch position, and place the CRF against the seat back such that it compresses the seat back cushion.

NOTE. A horizontal rearward force of 5 ± 2 N at Point "A" on the CRF is applied.

- (7) While maintaining the force on Point "A," measure the distance between Point "Z" of the CRF and the center of the anchorage bar. The measurement shall be made for both anchorages. The measurement shall be made parallel to the bottom surface of the CRF (see 2-3.2.A.(2)).

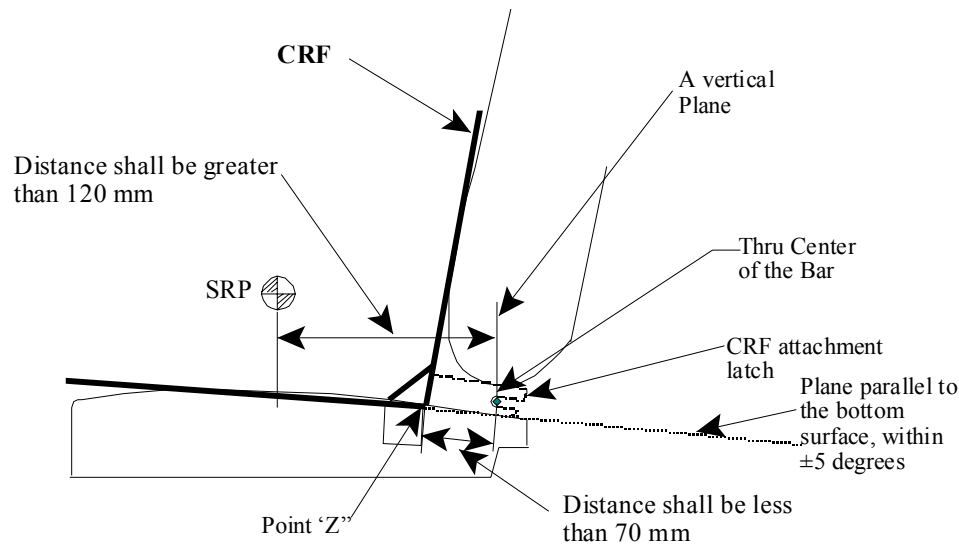


Figure A2. Optional Measurement of the Anchorage Location

- (8) Remove the CRF from the seat.
- (9) Measure the distance between the SRP to the center of the anchorage bar. The measurement shall be made horizontally to the center of the bar.
- (10) Record the measurement made on Data Sheet 3.

12-3.3. STATIC LOAD TESTING OF LOWER ANCHORAGES

A. Preparation of Test Vehicle

- (1) MODIFICATIONS MADE TO THE VEHICLE IN ORDER TO PERFORM THE TEST SHALL BE KEPT TO A MINIMUM. The test laboratory shall notify and obtain approval from the COTR for any required structural cutting or structural removal required on test vehicles prior to the conduct of such actions by the test laboratory.
- (2) Raise the test vehicle until all 4 wheels are at least 25 mm off the test surface and at its curb weight attitude. Secure the test vehicle to prevent lateral and longitudinal movement during the anchorage load application. Test vehicles must not be restrained by the front or rear bumper systems. Position the loading device so that load application angles will be obtained (see Figure A).
- (3) Adjust each seat being tested to its full rearward and full downward position and the seat back to its most upright position.
- (4) Attach the load cells to the load application cables, and connect the load application device to the load cells.
- (5) Perform pretest calibration checks on instrumentation prior to testing, and document for inclusion in the final report. Provide tolerance ranges on the tracings, chart, or data paper. If the test is video taped, provide tolerance range indicators (such as label or placard) on instruments so that it shall be apparent that the test was conducted within the test procedure requirements. Identify each recording with date, time, vehicle, NHTSA number, chart speed, if applicable, FMVSS number, X and Y axis names, units of measure and instrument settings. Record the serial numbers of equipments used for each specific load application location.
- (6) In the case of a row of DSPs that has more than one lower anchorage system, measure the center-to-center distance between adjacent seating position according to the following procedure:

Center-to-center distance measurement procedure:

- (6)-1. Locate the lower anchorages.
- (6)-2. Locate the midpoint of each bar. To locate the midpoint, use the horizontal section of the bar.
- (6)-3. Locate the midpoint that is equidistance from the midpoints of each of the two lower anchorages at the seating position (as illustrated in figure A-6 below).
- (6)-4. Measure the distance between the vertical longitudinal planes passing through the midpoints of the adjacent seating positions. The measure shall be made along a line perpendicular to the planes (as illustrated in figure A-6 below).

If the center-to-center distance is less than 400 mm, **inform the COTR prior to any loading application** on the anchorages. Unless otherwise directed by the COTR, the forces are applied simultaneously to the outboard lower anchorage systems.

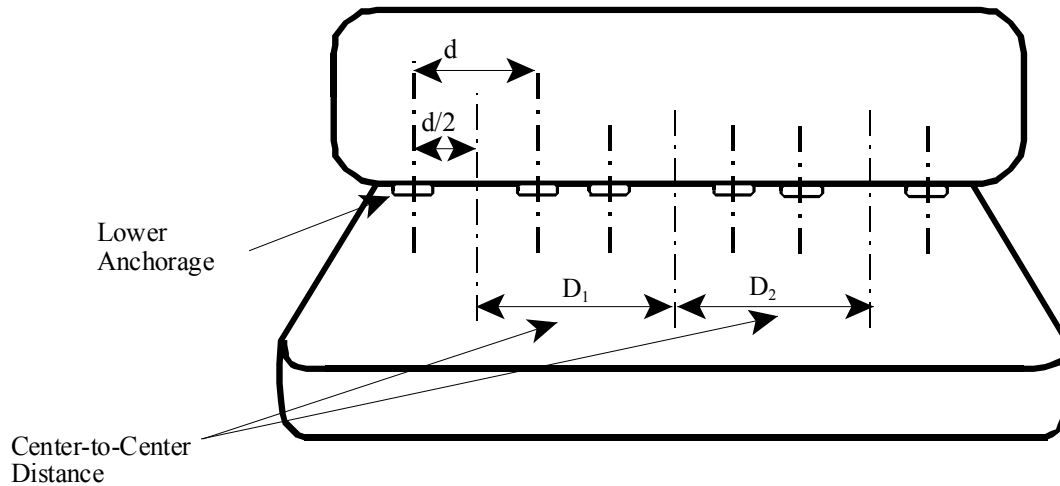


Figure A-6. Measurement of Distance Between Adjacent Seating Positions for Use in Simultaneous Testing.

B. Static Load Test

Table 9. Index for Static Load Testing

Manufactured Year	Remark	Applicable TP Sections
Vehicles manufactured on and after September 1, 2004	N/A	12-3.3.B-1
Vehicles manufactured from September 1, 1999 to August 31, 2004	at the manufacturer's option	12-3.3.B-1 or 12-3.3.B-2

Perform either 12-3.3.B-1 or 12-3.3.B-2, as directed by the COTR.

B-1 Lower Anchorages

- (1) If the seat is adjustable, adjust the vehicle seat to its full rearward and full downward position and place the seat back in its most upright position. If the SFAD 2 cannot be attached to the lower anchorages with the seat back in this position, adjust the seat back as recommended by the manufacturer's instruction (that will be provided by the COTR). If no instructions are provided, adjust the seat back to the position closest to the upright position that enable the SAFD 2 to attach to the lower anchorages.
- (2) Adjust the head restraint in accordance with the manufacturer's instructions, (the COTR will provide the instruction) for the child anchorage system. If instructions with regard to head restraint adjustment are not provided, adjust the head restraints to a position as directed by the COTR.
- (3) Inspect the SFAD 2 to determine there is no abnormality, such as cracks, cuts and deterioration.

(4) **Forward force direction:**

NOTE. The COTR shall determine the anchorages that are subjected to the forward force application.

- (a) Place the SFAD 2 in the vehicle seating position, and attach it to the two lower anchorages of the child restraint anchorage system.

NOTE. To adjust the attaching latches (of the SAFD 2), loosen the bolts (4 of them) after attaching the latches (of the SFAD 2) to the anchorage bars. With the bolts loosened, position the SFAD against the seat back. Apply a forward force of $135 \pm 15 \text{ N}$, parallel (within ± 5 degrees) to the horizontal plane of the vehicle, to the center of the lower front cross member of the SFAD 2 (see Figure A-7). Tighten up the bolts while maintaining the force.

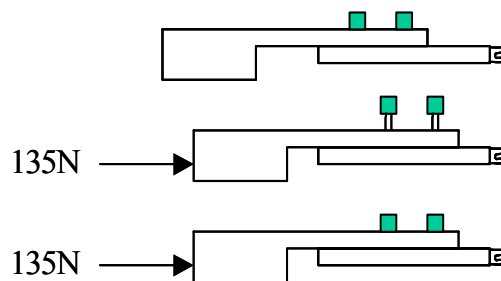


Figure A-7. SFAD 2 Installation – Side View

- (b) Determine the SFAD 2 is firmly attached.

NOTE 1. If the SFAD 2 cannot be attached to the anchorage, inform the COTR.

NOTE 2. Do not attach the tether anchorage.

NOTE 3. For the case where the anchorages are attached to the common seat frame and the center-to-center distances are 400 mm or greater, unless otherwise directed by the COTR, all the seat anchorages on the transverse plane will be loaded simultaneously.

NOTE 4. Remove the front seat(s), if necessary to allow access to the rear seat area. If there are more than two rows of seats, each row shall be tested in turn by going from the front of the vehicle to the back.

NOTE 5. The load cell should be selected such that the anticipated maximum load (i.e. 10,950 N) is in between 10% and 90% of the load capacity of the load cell.

NOTE 6. Unless otherwise directed by the COTR, output from the load cells shall not be (electronically) filtered. Unless otherwise directed by the COTR, the sampling rate shall not be less than 100 data points per second.

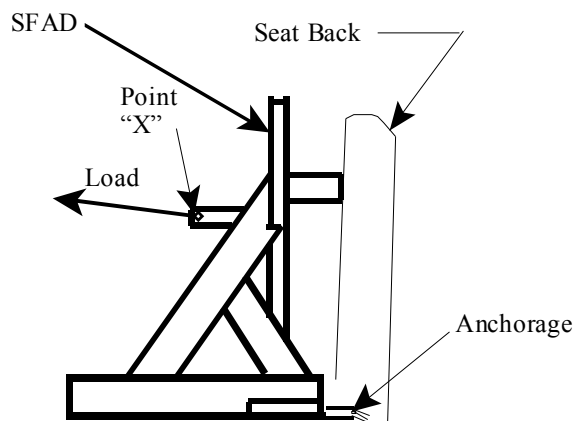
- (c) Initially, apply a force of 500 ± 50 N at Point “X” of the test device (see Figure 17) in a forward direction in a vertical longitudinal plane that is parallel within ± 5 degrees to the vehicle’s longitudinal centerline. Measure the angle between the force applied and the vertical longitudinal plane.

Measure the angle between the force applied and the horizontal longitudinal plane. The measure angles should be 10 ± 5 degrees above the horizontal plane. If the measured angles are not within 10 ± 5 degrees, adjust the direction of the force. While at this load level, photographs and measurements of the load application angles shall be taken (see Table 10).

- (d) Record the initial location of the anchorages and Point “X” with respect to the vehicle structure. The linear displacement can be measured with a string potentiometer (string pot).

Table 10. Parameters for the forward force application

	Force (N)	Duration (sec.)	Angle against the vertical plane (degree)	Angle against the horizontal plane (degree)
Pre-load	500 ± 50	N/A	0 ± 5	10 ± 5
At the target load	$10,950 \pm 450$	10 ± 1	N/A	N/A



SFAD against Seat Back

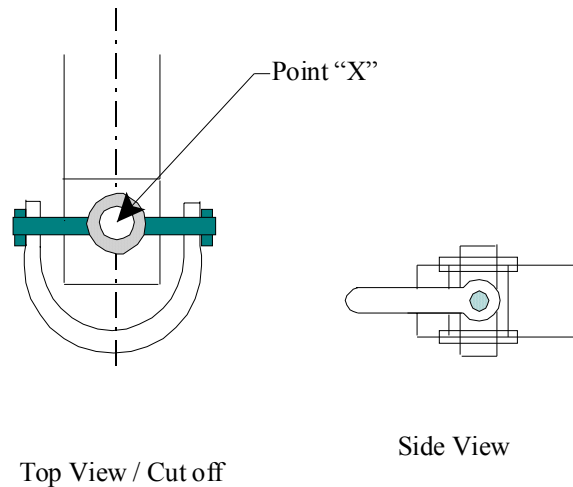


Illustration of Point "X" Setup

- (e) Maintain the direction of the force, and increase the force to $10,950 \pm 0, -450$ N in not less than 23 seconds and not more than 29 seconds, and maintain at an $10,950 \pm 0, -450$ N level for $10 \pm 0/-1$ seconds (see Figure B).

NOTE. Once the onset rate is selected, do not vary the onset rate until the force reaches to $10,950 \pm 0, -450$ N.

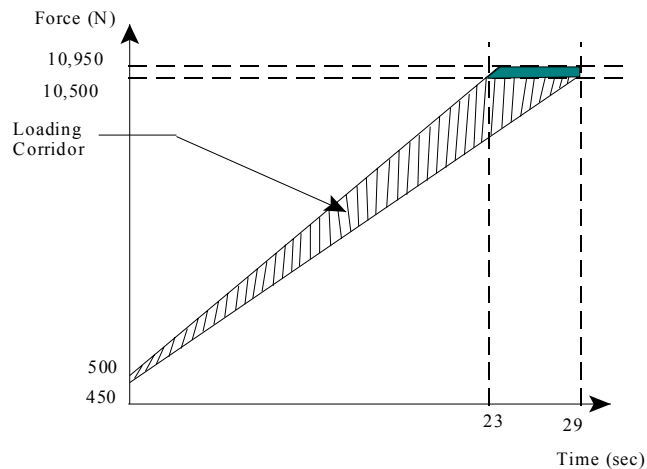


Figure B. Up-Loading Profile

- (f) Measure the displacement of Point "X" of the SFAD 2 along the direction of the force applied.

- (g) Reduce the force within 30 seconds.
- (h) Based on the measurement, calculate the horizontal displacement of the Point "X."

NOTE. For the calculation, use the initial angle (at the preload) and the measured displacement.

- (i) Record the data collected on Data Sheet 6. Descriptions of test vehicle damage resulting from the anchorage loadings shall be recorded on the "Report of Vehicle Condition at the Completion of Testing" form and included in the final report.

NOTE. Permanent deformation, including rupture or breakage, of any anchorage or surrounding area may not constitute a failure.

- (j) Take all post test photographs, and remove the SFAD 2 from the seat.

NOTE 1. The anchorages subjected to the forward force direction test shall not be subject to the lateral force direction test.

NOTE 2. If the loading cylinder runs out of stroke, the contractor will reload these anchorages and continue to test after completing the anchorage test on the unbroken anchorages.

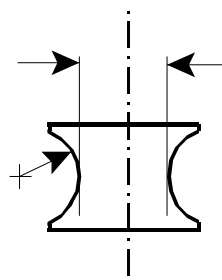
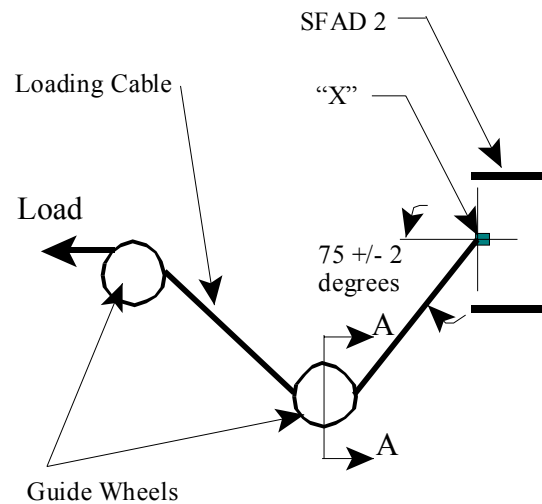
- (k) Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle.

(2) **Lateral force direction:**

NOTE 1. The COTR shall determine the anchorages that are subjected to the lateral force application.

NOTE 2. See Figure C as an example of a possible setup for the lateral force application.

- (a) Place the SFAD 2 in the vehicle seating position and attach it to the two lower anchorages of the child restraint anchorage system.



Section A-A

Figure C. Example of a possible lateral force application setup

NOTE: To adjust the attaching latches of the SFAD 2, loosen the bolts (4 of them) after attaching the latches (of the SFAD 2) to the anchorage bars. With the bolts loosened, position the SFAD against the seat back. Apply a reward force of $135 \pm 15\text{N}$, parallel (within ± 5 degrees) to the horizontal plane of the vehicle, to the center of the lower front cross member of the SFAD 2. Tighten up the bolts while maintaining the force.

(b) Determine the SFAD 2 is firmly attached.

NOTE. If the SFAD 2 cannot be attached to the anchorage, inform the COTR.

NOTE 1. Do not attach the tether anchorage.

- NOTE 2. The anchorages subjected to the forward force direction test shall not be used for the lateral force direction test.
- NOTE 3. The anchorages subjected to the lateral force direction test shall not be used for additional lateral force direction test.
- NOTE 4. For the case where the anchorages are attached to the common seat frame and the center-to-center distances are 400 mm or greater, unless otherwise directed by the COTR, all the seat anchorages on the transverse plane will be loaded simultaneously in the same lateral direction.
- NOTE 5. Remove the front seat(s), if necessary to allow access to the rear seat area. If there are more than two rows of seats, each row shall be tested in turn by going from the front of the vehicle to the back.
- NOTE 6. Remove the vehicle body panels or parts, if necessary to perform the lateral force application. Care must be exercised when removing the body panels. Prior to any removal of the body panels or parts, the contractor must obtain a verbal or written approval from the COTR.
- (c) Apply a force of $500+0/-50$ N at Point “X” of the test device (see Figure 17) in the lateral direction in a vertical longitudinal plane that is 75 ± 2 degrees to either side of a vehicle longitudinal plane, as directed by the COTR, that is parallel to the vehicle’s longitudinal centerline. Measure the angle between the force applied and the horizontal longitudinal plane to ensure that the measure angle is within 5 degrees with respect to the horizontal plane. If the measured angle is greater than 5 degrees, adjust the direction of the force. While at this load level, photographs and measurements of the load application angles shall be taken.
- (d) Record the initial location of the anchorages with respect to the vehicle structure at the pre-load.
- (e) Maintain the direction of the force, and increase the force to $4,950 +0, -150$ N in not less than 23 seconds and not more than 29 seconds, and maintain at a $4,950 +0, -150$ N level for $10 +0/-1$ seconds (see Figure D).

Table 11. Parameters for the lateral force application

	Force (N)	Duration (sec)	Angle against the vertical plane (deg.)	Angle against the horizontal plane (deg.)
Pre-load	500 +0/- 50	N/A	75±2	±5
At the target load	4,950 +0/-150	10 +0/-1	N/A	N/A

NOTE. Once the onset rate is selected, do not vary the onset rate until the force reaches to 4,950 +0, - 150 N.

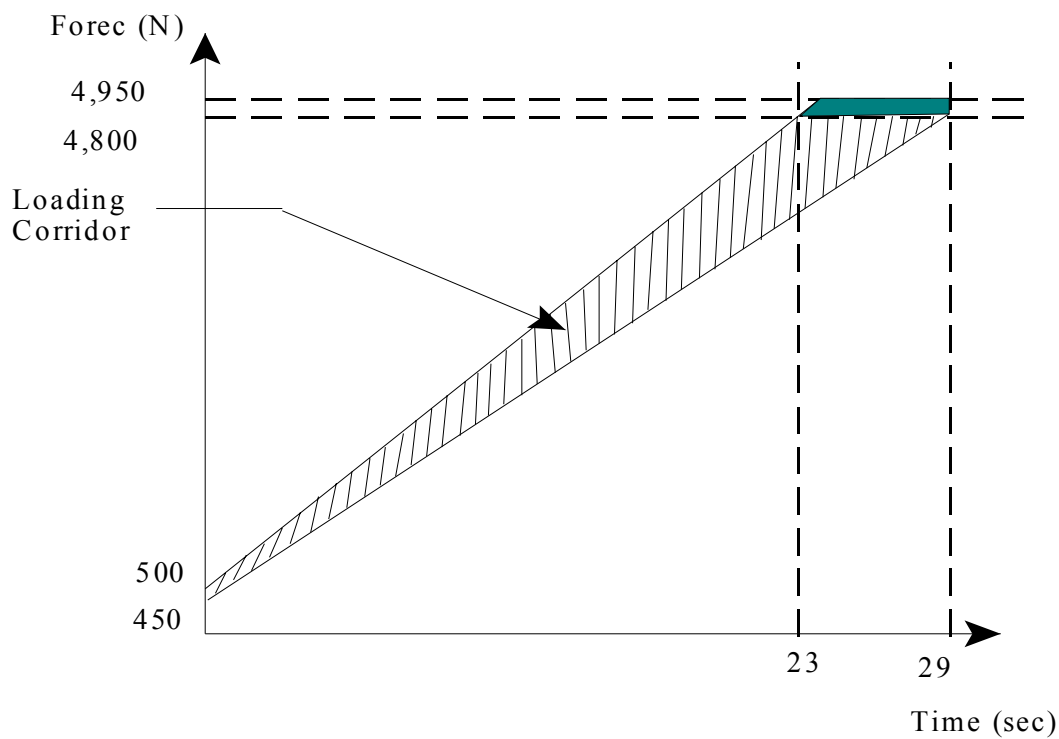


Figure D. Up-Loading Profile

- (f) Measure the displacement of Point “X” of the SFAD 2 along the direction of the force applied.
- (g) Gradually reduce the load within 30 seconds.
- (h) Based on the measurement, calculate the horizontal displacement of the Point “X.”

NOTE 1. For the calculation, use the initial angle (at the preload) and the measured displacement.

NOTE 2. Horizontal Displacement = Measured displacement x Cos 2

- (i) Record the data collected on Data Sheet 7. Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle. Take all post test photographs.

NOTE 1. Permanent deformation, including rupture or breakage, of any anchorage or surrounding area may not constitute a failure.

NOTE 2. If the loading cylinder runs out of stroke, the contractor will reload these anchorages and continue to test after completing the anchorage test on the unbroken anchorages.

- (J) Remove the SFAD 2 from the seat.
- (k) Descriptions of test vehicle damage resulting from the anchorage loadings shall be recorded on the "Report of Vehicle Condition at the Completion of Testing" form and included in the final report.

B-2. **(S15.2) Optional Lower Anchorage Static Loading.** If the vehicle is certified with S15.2 of FMVSS 225, use the following procedures:

1. Verify with the COTR the option used by the manufacturer for certifying for the strength requirement.
2. If the seat is adjustable, adjust the vehicle seat to the position recommended by the vehicle manufacturer for use with child restraint systems. If there is no recommended position, adjust the seats to their full downward position and the seat back is placed in its most upright position.
3. Adjust the head restraint in accordance with the manufacturer's instructions, (provided by the COTR), for the child anchorage system. If instructions with regard to head restraint adjustment are not provided, adjust the head restraints to a position as directed by the COTR.

NOTE. Storable anchorages shall be positioned in "use" position prior to any loading.

4. Inspect the SFAD 2 to determine there is no abnormality, such as cracks, cuts and deterioration.
5. In the case of a row of DSPs that has more than one lower anchorage system, measure the center-to-center distance between adjacent seating position according to the following procedure:

Center-to-center distance measurement procedure:

- (5)-1. Locate the lower anchorages.
- (5)-2. Locate the midpoint of each bar. To locate the midpoint, use the horizontal section of the bar.

- (5)-3. Locate the midpoint that is equidistance from the midpoints of each of the two lower anchorages at the seating position (as illustrated in figure A-6 below).
- (5)-4. Measure the distance between the vertical longitudinal planes passing through the midpoints of the adjacent seating positions. The measure shall be made along a line perpendicular to the planes (as illustrated in figure A-6 below).

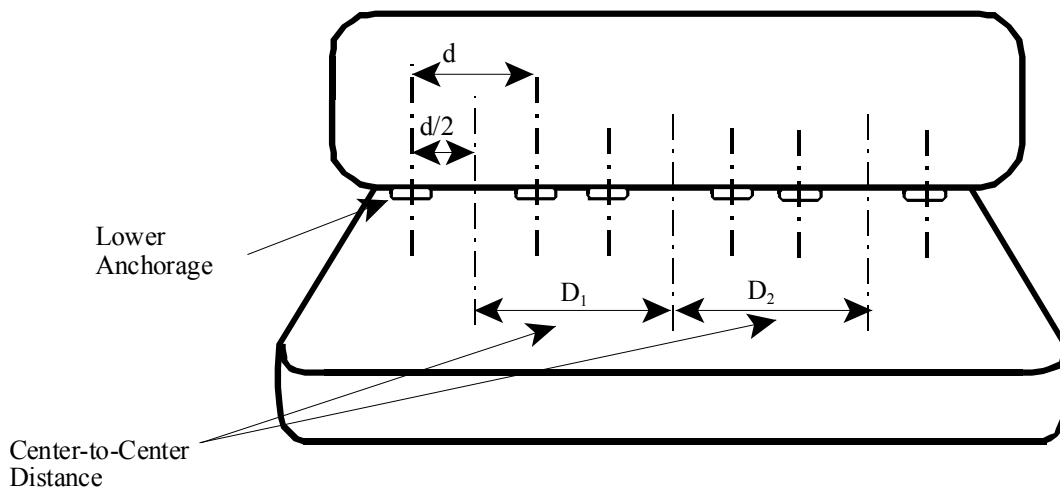


Figure A-6. Measurement of Distance Between Adjacent Seating Positions for Use in Simultaneous Testing.

If the center-to-center distance is less than 400 mm, **inform the COTR prior to any loading application** on the anchorages. Unless otherwise directed by the COTR, the forces are applied simultaneously to the outboard lower anchorage systems.

(6) **Forward force application:**

NOTE. The COTR shall determine the anchorages that are subjected to the forward force application.

- (a) Place the SFAD 2 in the vehicle seating position, and attach it to the two lower anchorages of the child restraint anchorage system.

NOTE. To adjust the attaching latches, loosen the bolts (4 of them) after attaching the latches (of the SFAD 2) to the anchorage bars. With the bolts loosened, position the SFAD 2 against the seat back. Apply a forward force of $135 \pm 15\text{N}$, parallel (within 5 degrees) to the horizontal plane of the vehicle, to the center of the lower front cross member of the SFAD 2. Tighten up the bolts while maintaining the force.

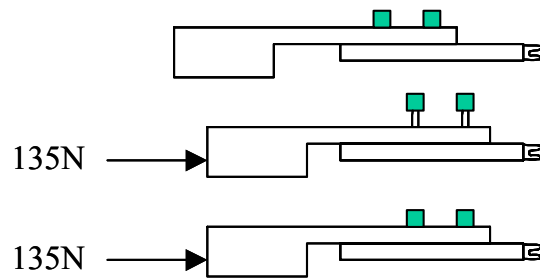


Figure A-7. SFAD 2 Installation – Side View

- (b) Determine that the SFAD 2 is firmly attached.

NOTE 1. If the SFAD 2 cannot be attached to the anchorage, inform the COTR.

NOTE 2. Do not attach the tether anchorage.

NOTE 3. For the case where the anchorages are attached to the common seat frame and the center-to-center distances are 400 mm or greater, unless otherwise directed by the COTR, all the seat anchorages on the transverse plane will be loaded (in forward direction) simultaneously.

NOTE 4. Remove the front seat(s), if necessary to allow access to the rear seat area. If there are more than two rows of seats, each row shall be tested in turn by going from the front of the vehicle to the back.

NOTE 5. Unless otherwise directed by the COTR, output from the load cells shall not be (electronically) filtered. *Unless otherwise directed by the COTR, the sampling rate shall not be less than 100 data points per second.*

NOTE 6. The load cell should be selected such the anticipated maximum load (7,950 N) is in between 10% and 90% of the load capacity of the load cell manufacture.

- (c) Initially, apply a force of 500 ± 50 N at Point “X” of the test device (see Figure 17) in a forward direction in a vertical longitudinal plane that is parallel within ± 5 degrees to the vehicle’s longitudinal centerline. Measure the angle between the force applied and the vertical longitudinal plane.

Measure the angle between the force applied and the horizontal longitudinal plane. The measure angle between the force applied and the horizontal longitudinal plane shall be 10 ± 5 degrees. If the measured angle is not within 10 ± 5 degrees, adjust the direction of the force. While at this load level, photographs and measurements of the load application angles shall be taken.

- (d) Record the initial location of the anchorages with respect to the vehicle structure. The linear displacement can be measured with a string potentiometer (string pot).

- (e) Maintain the direction of the force, and increase the force to 7,950 +0, - 200 N **within 2 seconds** and maintain at a 7,950 +0, -200 N level for a period of 0.25±0.05 second.

NOTE: Once the onset rate is selected, do not vary the onset rate until the force reaches to 7,950 +0, - 200 N.

Table 12. Parameters for the optional forward force application

	Force (N)	Duration (sec)	Angle against the vertical plane (deg.)	Angle against the horizontal plane (deg.)
Pre-load	500 +0/-50	N/A	0±5	10±5
At the target load	7,950 +0/-200	0.25 +0/-0.05	N/A	N/A

- (f) Measure the displacement of Point “X” of the SFAD 2. Based on the measurement, calculate the horizontal displacement of the Point “X.”

NOTE 1. For the calculation, use the initial angle (at the preload) and the measured displacement.

NOTE 2. Horizontal Displacement = Measured displacement x cos θ

- (g) Reduce the load within 30 seconds.

- (h) Record the data collected on Data Sheet 6. Descriptions of test vehicle damage resulting from the anchorage loadings shall be recorded on the "Report of Vehicle Condition at the Completion of Testing" form and included in the final report. Permanent deformation, including rupture or breakage, of any anchorage or surrounding area may not constitute a failure. Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle. Take all post test photographs.

- (i) Remove the SFAD 2 from the seat.

NOTE 1. The anchorages subjected to the forward force direction test shall not be subject to the lateral force direction test.

NOTE 2. If the loading cylinder runs out of stroke, the contractor will reload these anchorages and continue to test after completing the anchorage test on the unbroken belts and anchorages.

- (j) Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle.

(8) **Lateral force direction:**

NOTE. The COTR shall determine the anchorages that are subjected to the lateral force application.

- (a) If the seat is adjustable, adjust the vehicle seats to the position recommended by the vehicle manufacturer for use with child restraint systems. (The COTR will provide the information.) If there is no recommended position, adjust the seat to its full downward position and the seat back is placed in its most upright position.
- (b) Adjust the head restraint in accordance with the manufacturer's instructions, provided by the COTR, for the child anchorage system. If instructions with regard to head restraint adjustment are not provided, adjust the head restraints to a position as directed by the COTR.
- (c) Place SFAD 2 in the vehicle seating position and attach it to the two lower anchorages of the child restraint anchorage system
- (d) Determine that the SFAD 2 is firmly attached.

NOTE 1. **Do not attach the tether anchorage.**

NOTE 2. The anchorages subjected to the forward direction force test shall not be used for the lateral direction force test.

NOTE 3. The anchorages subjected to the lateral direction force test shall not be used for additional lateral force test.

NOTE 4. If a center-to-center distance between adjacent seating position is less than 400 mm, inform the COTR prior to any loading application on the anchorages.

NOTE 5. For the case where the anchorages are attached to the common seat frame and the center-to-center distances are 400 mm or greater, unless otherwise directed by the COTR, all the seat anchorages on the transverse plane will be loaded simultaneously in the same lateral direction.

NOTE 6. Remove the front seat(s), if necessary to allow access to the rear seat area. If there are more than two rows of seats, each row shall be tested in turn by going from the front of the vehicle to the back.

NOTE 7. Remove the vehicle body panels, if necessary to perform the lateral force application. Care must be exercised when removing the body panels. Prior to any removal of the body panels or sections, the contractor must obtain a verbal or written approval from the COTR

- (e) Record the initial location of the anchorages with respect to the vehicle structure. The linear displacement can be measured with a string potentiometer (string pot)
- (f) Apply a force (preload) of 500 ± 50 N at Point "X" of the test device (see Figure 17) in the lateral direction in a vertical longitudinal plane that is 75 ± 2 degrees to either side of a vehicle longitudinal plane, as directed by the COTR, that is parallel to the vehicle's longitudinal centerline.

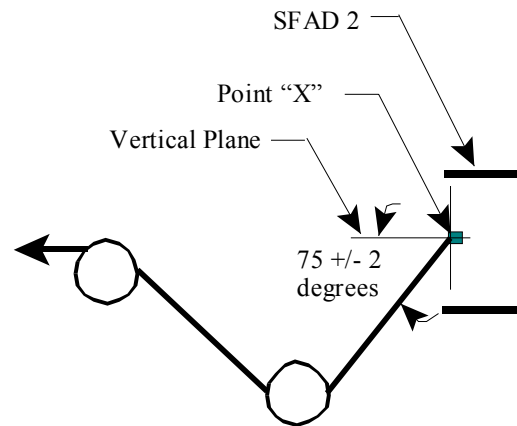


Figure E. Illustration of the required angles

Measure the angle between the force applied and the horizontal longitudinal plane to ensure that the measure angle is within 5 degrees (see 1 in Figure E). If the measured angle is greater than 5 degrees, adjust the direction of the force. While at this load level, photographs and measurements of the load application angles shall be taken.

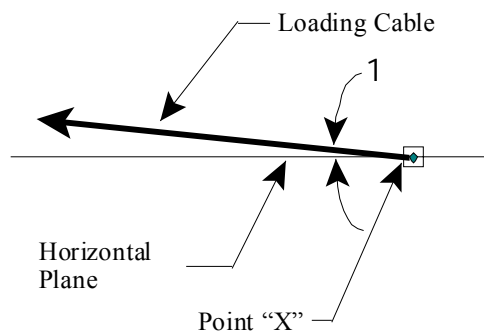
Table 13. Parameters for the optional lateral force application

	Force (N)	Duration (sec.)	Angle against the vertical plane (deg.)	Angle against the horizontal plane (deg.)
Pre-load	500+0/-50	N/A	75±2	0±5
At the target load	4,950 +0/-150	0.25+0/-0.05	N/A	N/A

- (g) Record the initial location of the anchorage at the preload.
- (h) Maintain the direction of the force, and increase the force to 4,950 +0, - 150 N **within 2 seconds**, and maintain at a 4,950 +0, -150 N level for a period of 0.25 ±0.05 second.

NOTE. Once the onset rate is selected, do not vary the onset rate until the force reaches to the target load (of 4,950 +0, - 150 N).

- (i) Measure the displacement of Point “X” of the SFAD 2.
- (j) Gradually reduce the load within 30 seconds.
- (k) Based on the measurement, calculate the horizontal displacement of the Point “X.”



Angle with Horizontal Longitudinal Plane:
SideView

NOTE. For the calculation, use the initial angle (at the preload) and the measured displacement.

- (l) Record the data collected on Data Sheet 7. Descriptions of test vehicle damage resulting from the anchorage loadings shall be recorded on the "Report of Vehicle Condition at the Completion of Testing" form and included in the final report. Permanent deformation, including rupture or breakage, of any anchorage or surrounding area may not constitute a

failure. Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle. Take all post test photographs.

NOTE. If the loading cylinder runs out of stroke, the contractor will reload these anchorages and continue to test after completing the anchorage test on the unbroken anchorages.

(m) Remove the SFAD 2 from the seat.

(n) Any anomalies shall be reported immediately to the COTR prior to the next step in testing the vehicle.

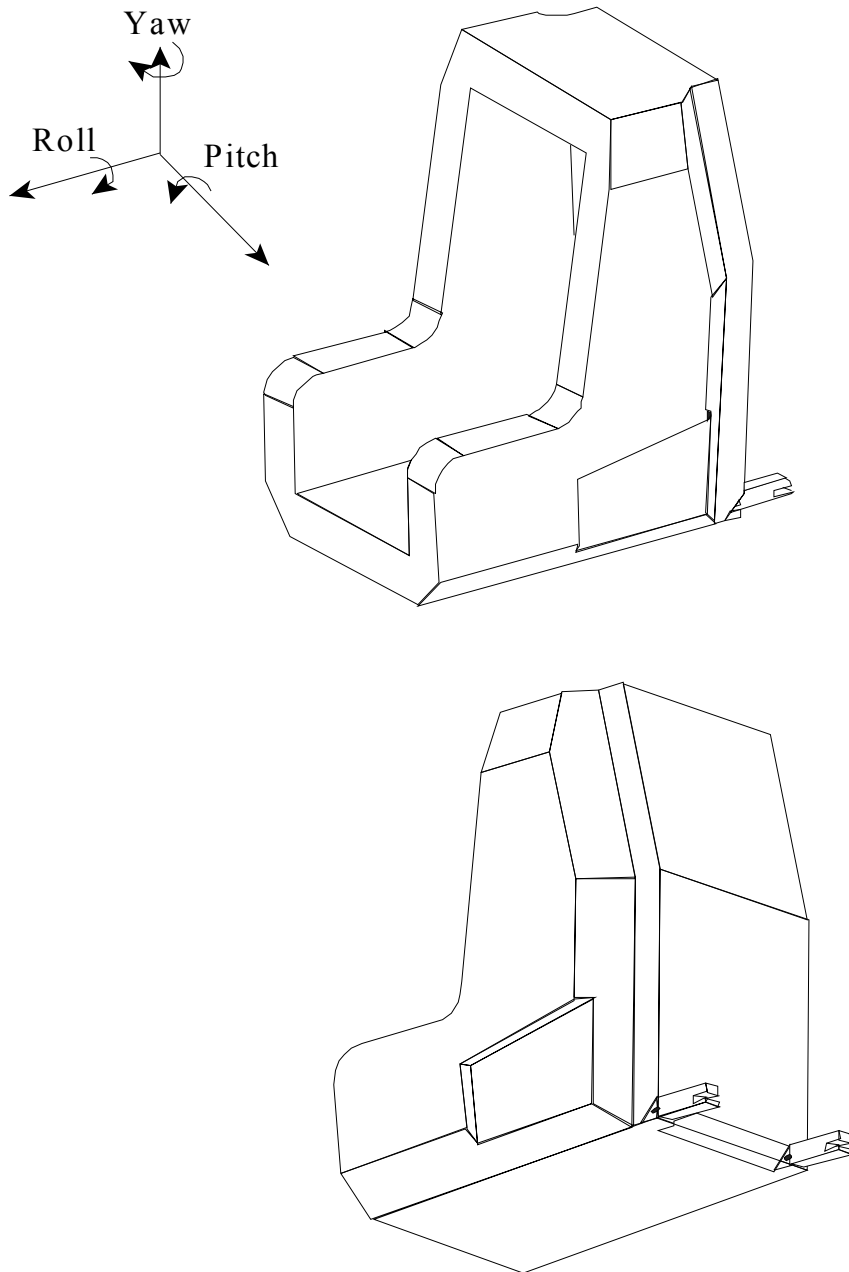


Figure 1. Child Restraint Fixture (CRF)

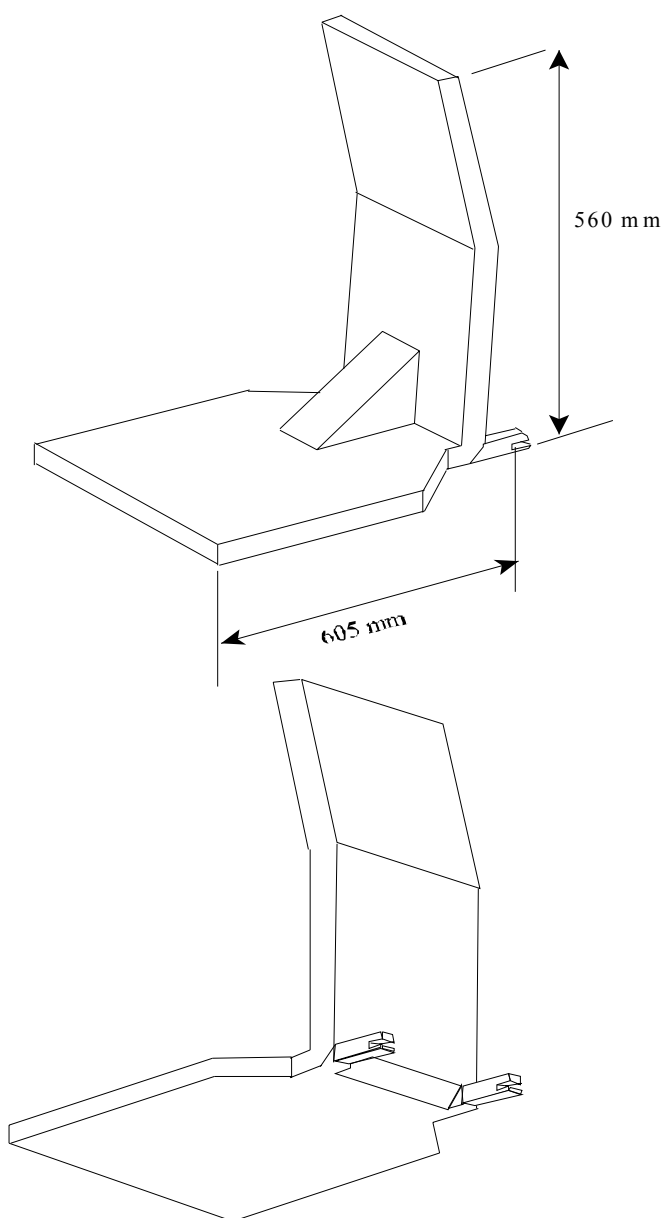


Figure 1A. Child Restraint Fixture (CRF) with the side panels removed

Note:

1. The material shall be the same as that of the CRF.
2. The thickness of the bottom and back plates shall be the same as that of the CRF.
3. The dimension and the configuration of the attachment that connects to the lower anchorages shall be the same as that of the CRF.

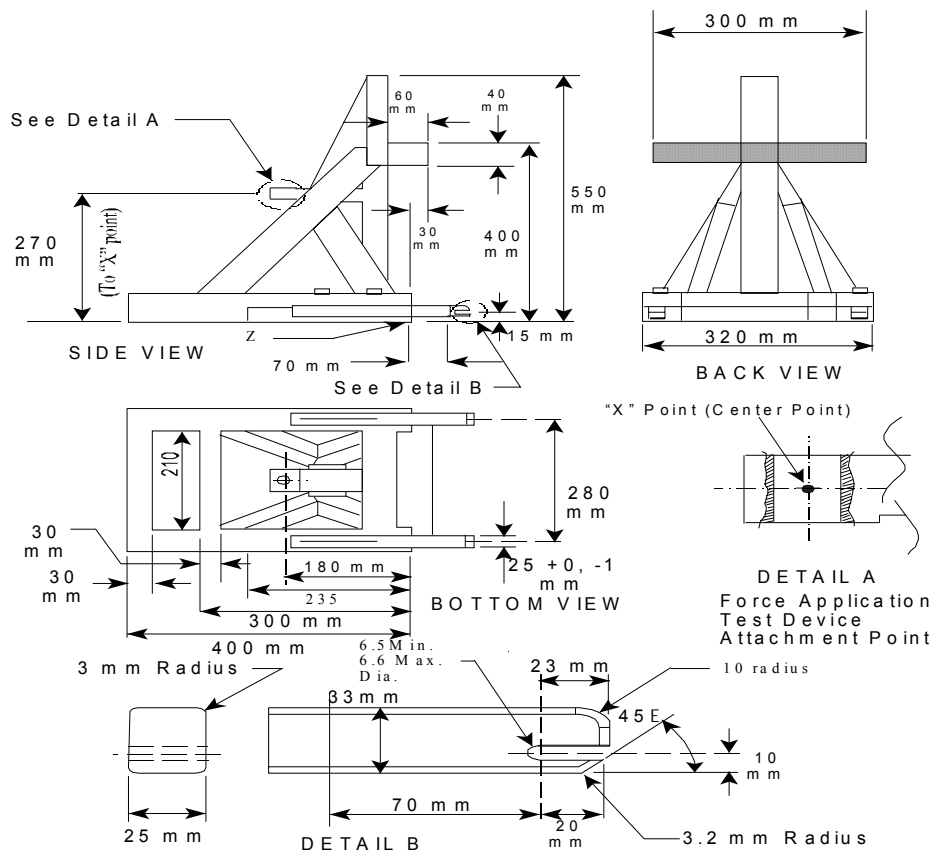


Figure 17. Side, Back and Bottom Views, ISO 13216-1 Static Force Application Device 2 (SFAD 2)

Notes Drawing not to scale.

1. Dimensions in mm, except where otherwise indicated
2. Securely welded construction. Device stiffness satisfied when using a securely welded construction consisting of rectangular 3 mm steel tubing and 6 mm thick load application plate. If construction not as per note 3, stiffness of device is satisfied if movement of point "X" is not more than 2 mm in any direction when forces are applied as specified in FMVSS No. S15.2.1, with device attached to rigid anchorage bars and the front cross member supported by a rigid bar that is held at the center by a longitudinal pivot 25 mm below the SFAD2 base (as shown in broken line) to allow bending and twisting of the base of the device. Any measurable deformation of the anchorage bars to be excluded from the measurements of the movement of point "X."
3. The bearing surface of the mechanism that locks to the anchorage bar shall have a $3.05 - 0 + 0.50$ mm radius. When locked, the maximum horizontal distance between two bearing surface that containing the bar shall be 6.0 ± 0.1 mm.

Front of the fixture (SFAD 2)

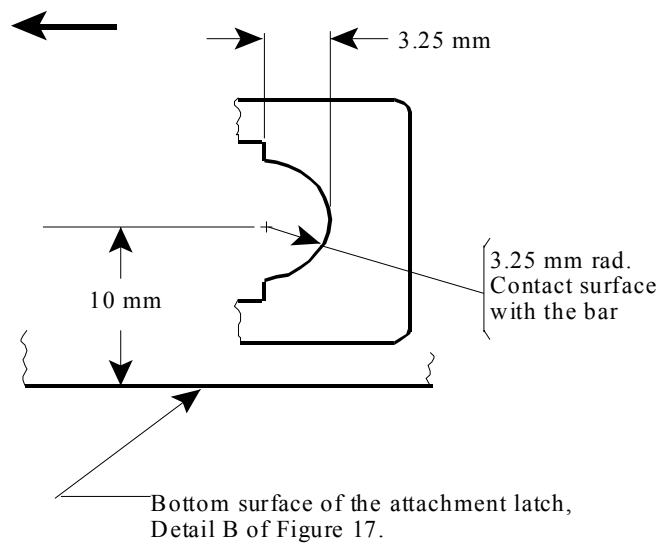




Figure 17A. Illustration of the mechanism that locks onto the anchorage bar.

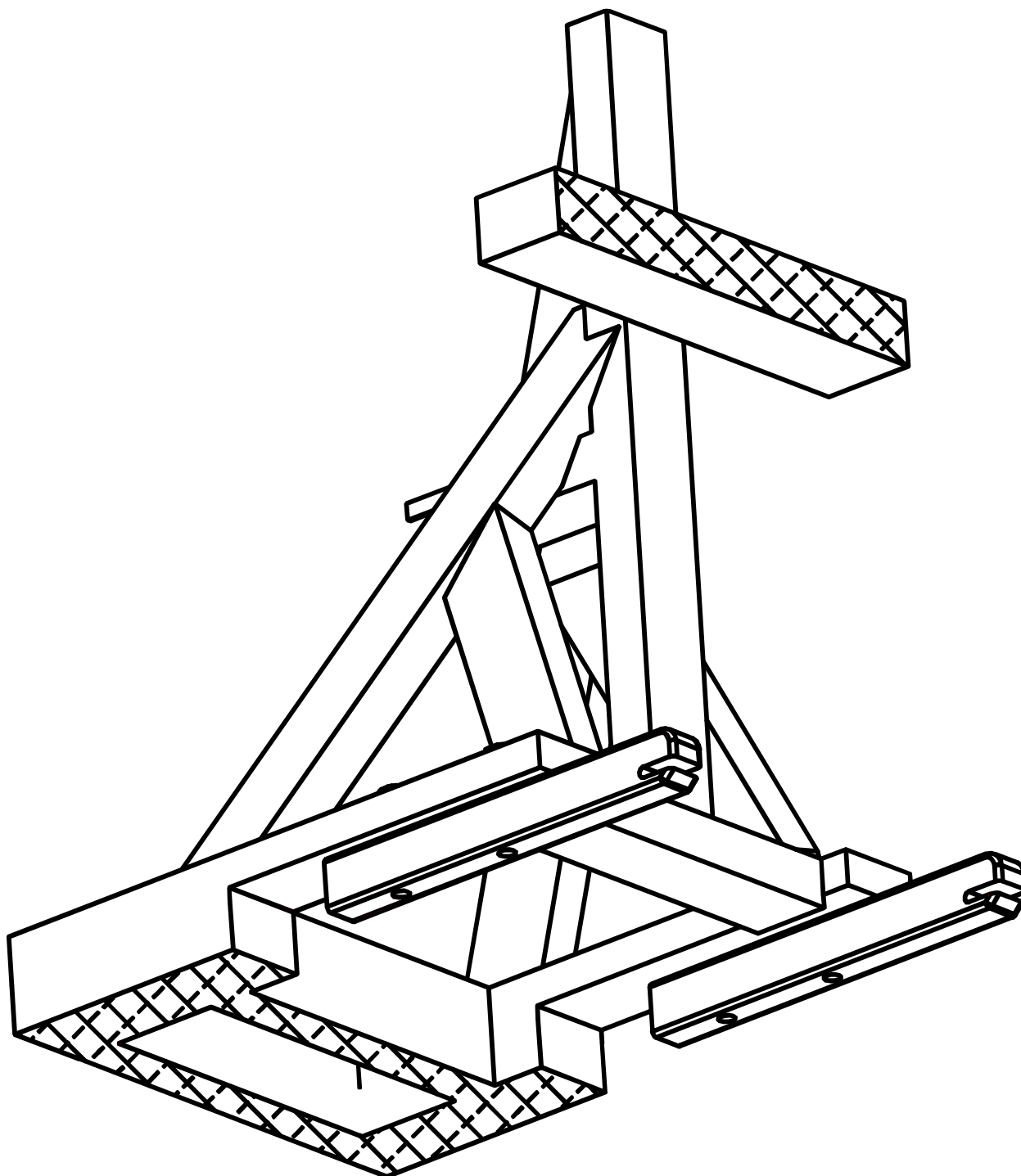


Figure 18. Three-dimensional Schematic Views of the ISO 13216-1 Static Force Application Device 2 (SFAD 2)

Note. The three-dimensional schematic views above is for information only. For the dimensions, see Figure 17.

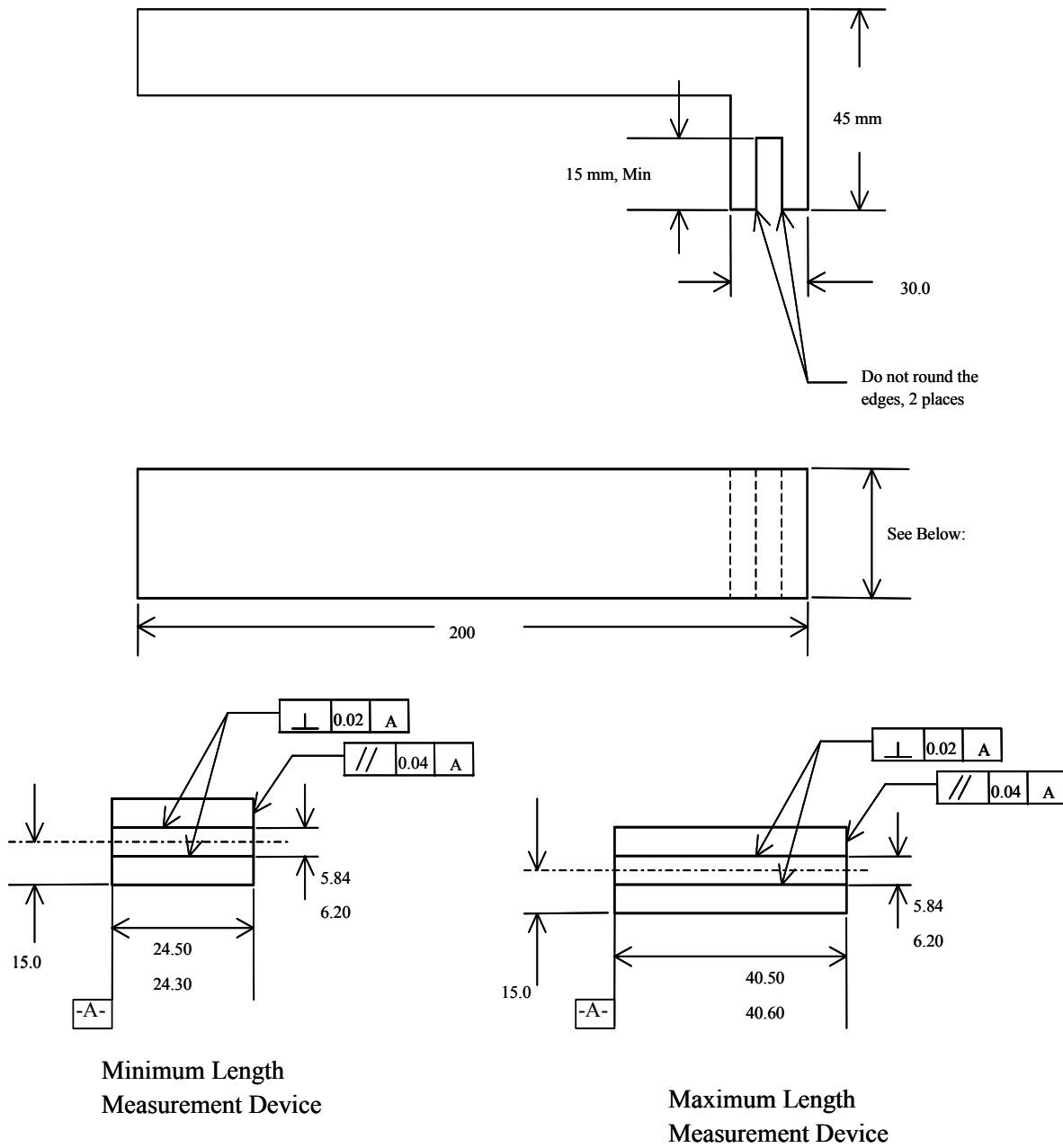
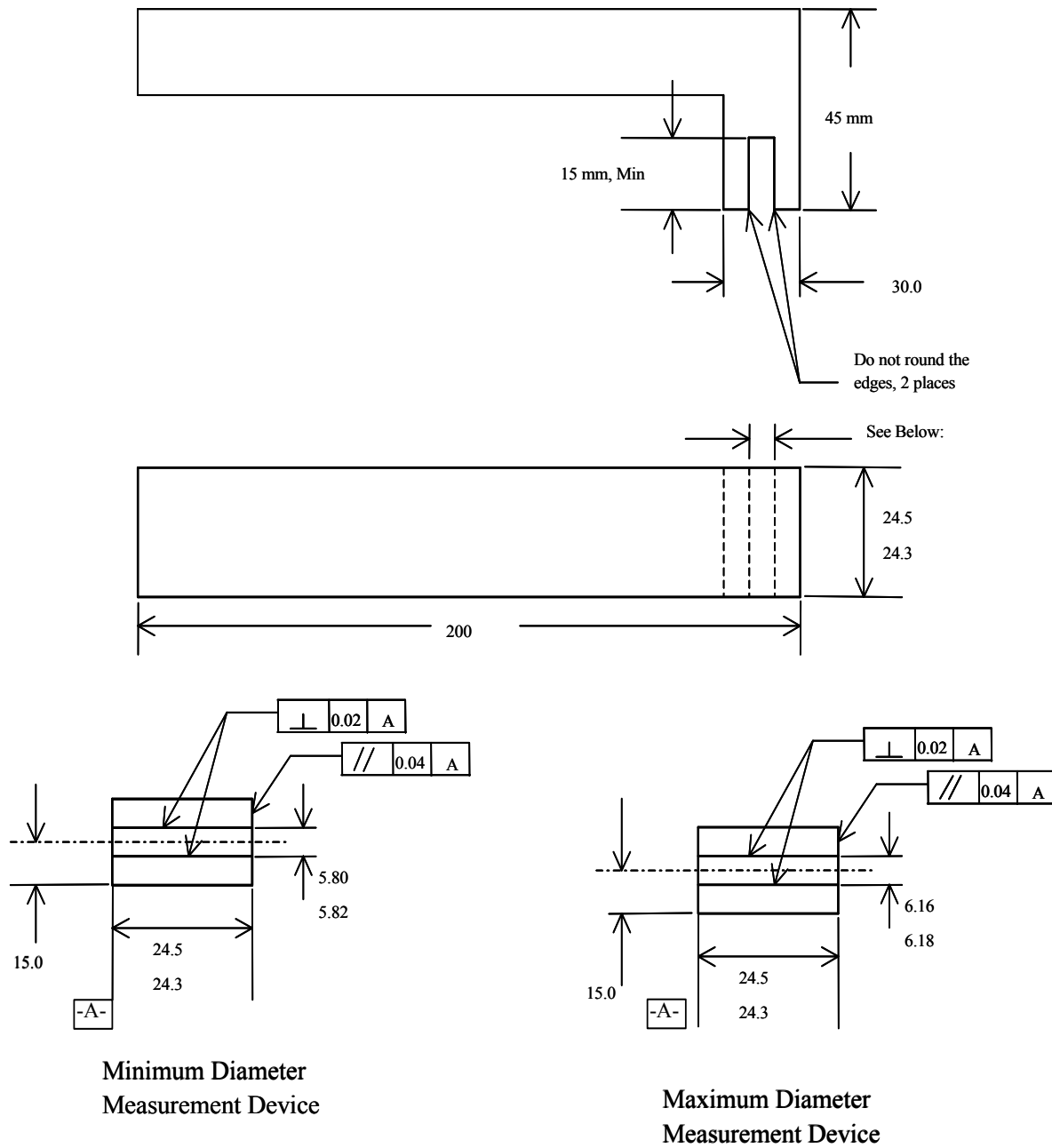


Figure 18A. Measurement Devices for the inside Bar Length



Unit: mm

Material: S.S.

Figure 18B. Measurement Devices for the Bar Diameter

13. POST TEST REQUIREMENTS

13.1 Verification of Data.

The Contractor shall re-verify all instrumentation and check data sheets.

13.2 Evaluation of Written Instruction for Meaning of Lower Anchorage Marking.

If the vehicle has an owner's manual, the Contractor shall review the lower anchorage attachment instruction in the owner's manual. Note any ambiguity in the instruction.

If the instruction does not include meaning of the markings provided for the lower anchorages, record "Noncompliance" in the report.

14. REPORTS

14.1. Monthly Status Reports

The contractor shall submit a monthly Test Status Report and a Vehicle or Equipment Status Report to the COTR. The Vehicle or Equipment Status Report shall be submitted until all vehicles or items of equipment are disposed of. See Forms for samples of the required Monthly Status Reports.

14.2. Apparent Test Failure

Any indication of a test failure shall be communicated by telephone to the COTR within 24 hours with written notification mailed within 48 hours (Saturday and Sunday hours excluded). A Notice of Test Failure (see Forms) with a copy of the particular compliance test data sheet(s) and preliminary data plot(s) shall be included.

In the event of a test failure, a post test calibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration shall be at the COTR's discretion and shall be performed without additional costs to the OVSC.

14.3. Final Test Reports

14.3.1 Copies

In the case of a test failure, **seven** copies of the Final Test Report shall be submitted to the COTR for acceptance within three weeks of test completion. The Final Test Report format to be used by all contractors can be found in this section.

Where there has been no indication of a test failure, **three** copies of each Final Test Report shall be submitted to the COTR for acceptance within three weeks of test completion. Payment of contractor's invoices for completed compliance tests may be withheld until Final Test Report acceptance by the COTR. Contractors are requested to NOT submit invoices before the COTR is provided with copies of the Final Test Report.

Contractors are required to submit the first Final Test Report in draft form within two weeks after the compliance test is conducted. The contractor and the COTR will then be

able to discuss the details of both test conduct and report content early in the compliance test program.

Contractors are required to PROOF READ all Final Test Reports before submittal to the COTR. The OVSC will not act as a report quality control office for contractors. Reports containing a significant number of errors will be returned to the contractor for correction, and a "hold" will be placed on invoice payment for the particular test.

14.3.2 Requirements

The Final Test Report, associated documentation (including photographs) are relied upon as the chronicle of the compliance test. The Final Test Report will be released to the public domain after review and acceptance by the COTR. For these reasons, each final report must be a complete document capable of standing by itself and containing all data sheets.

The contractor should use detailed descriptions of all compliance test events. Any events that are not directly associated with the standard but are of technical interest should also be included. The contractor should include as much detail as possible in the report.

Instructions for the preparation of the first three pages of the final test report are provided for standardization.

14.3.3 First Three Pages

A. FRONT COVER

A heavy paperback cover (or transparency) shall be provided for the protection of the final report. The information required on the cover is as follows:

Final Report Number such as 225-ABC-0X-001, where —

225 is the FMVSS tested
 ABC are the initials for the laboratory
 0X is the Fiscal Year of the test program
 001 is the Group Number (001 for the 1st test, 002 for the 2nd test, etc.)

Final Report Title And Subtitle such as

SAFETY COMPLIANCE TESTING FOR FMVSS 225
 Child Restraint Anchorage Systems
 Lower Anchorages
 * * * * *
 Name of Vehicle Manufacturer
 Model Year, Make/Model, Body Style
 NHTSA Number Test Vehicle

Contractor's Name and Address such as

COMPLIANCE TESTING LABORATORIES, INC.
 4335 West Dearborn Street

Detroit, Michigan 48090

NOTE: DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (3) AND (4)

Date of Final Report Completion such as "March 15, 200X"

The words "FINAL REPORT"

The sponsoring agency's name and address as follows —

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6115 (NSA-30)
Washington, DC 20590

14. REPORTS....Continued**B. FIRST PAGE AFTER FRONT COVER**

A disclaimer statement and an acceptance signature block for the COTR shall be provided as follows

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: _____

Approved By: _____

Approval Date: _____

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

Acceptance Date: _____

14. REPORTS....Continued**C. SECOND PAGE AFTER FRONT COVER**

A completed Technical Report Documentation Page (Form DOT F1700.7) shall be completed for those items that are applicable with the other spaces left blank. Sample data for the applicable block numbers of the title page follows.

Block 1 — REPORT NUMBER

225-ABC-0X-001

Block 2 — GOVERNMENT ACCESSION NUMBER

Leave blank

Block 3 — RECIPIENT'S CATALOG NUMBER

Leave blank

Block 4 — TITLE AND SUBTITLE

Final Report of FMVSS 225 Compliance Testing, Lower Anchorages, of 200X Ace
TK Super 2-door Coupe, NHTSA No. CX0401

Block 5 — REPORT DATE

March 15, 200X

Block 6 — PERFORMING ORGANIZATION CODE

ABC

Block 7 — AUTHOR(S)

John Smith, Project Manager / Bill Doe, Project Engineer

Block 8 — PERFORMING ORGANIZATION REPORT NUMBER

ABC-DOT-XXX-001

Block 9 — PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories
405 Main Street
Detroit, MI 48070

14. REPORTS....Continued**Block 10 — WORK UNIT NUMBER**

Leave blank

Block 11 — CONTRACT OR GRANT NUMBER

DTNH22-0X-D-12345

Block 12 — SPONSORING AGENCY NAME AND ADDRESS

US Department of Transportation
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance (NSA-30)
400 Seventh Street, SW, Room 6115
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 200X

Block 14 — SPONSORING AGENCY CODE

NSA-30

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 199X Ace TK Super 2-door coupe in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-225L-X for the determination of FMVSS 225 compliance. Test failures identified were as follows:

None

NOTE: Above wording must be shown with appropriate changes made for a particular compliance test. Any questions should be resolved with the COTR.

14. REPORTS....Continued**Block 17 — KEY WORDS**

Compliance Testing
Safety Engineering
FMVSS 225

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from —

NHTSA Technical Reference Division
Room 5108 (NAD-52)
400 Seventh St., SW
Washington, DC 20590
Telephone No.: 202-366-4946

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Unclassified

Block 20 — SECURITY CLASSIFICATION OF PAGE

Unclassified

Block 21 — NUMBER OF PAGES

Add appropriate number

Block 22 — PRICE

Leave blank

14. REPORTS....Continued

14.3.4 Table of Contents

Final test report Table of Contents shall include the following:

Section 1 —	Purpose of Compliance Test
Section 2 —	Compliance Test Data Summary
Section 3 —	Compliance Test Data
Section 4 —	Noncompliance Data (if applicable)
Section 5 —	Photographs

15. DATA SHEETS

DATA SHEET 1
RESERVED

15. DATA SHEETS....Continued

DATA SHEET 2 CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION

VEH. MOD YR/MAKE/MODEL/BODY: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____

OBSERVERS: _____

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR	THIRD
Above anchorage, permanently marked with a circle not less than 13 mm in Dia.; and whose color contrasts with its background; and its center is not less than 50 mm and not more than 75 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.	Left	N/A*		
	Center			
	Right			
Each of the bars is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical longitudinal plane passing through the center of the bar, along a line marking an up ward 30 degree angle with a horizontal plane.	Left	N/A*		
	Center			
	Right			
Diameter of the bar (mm).	Left	N/A*		
	Center			
	Right			
Inspect if the bars are straight, horizontal and transverse.	Left	N/A*		
	Center			
	Right			

CHILD RESTRAINT LOWER ANCHORAGES CONFIGURATION (continued)

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR	THIRD
Inspect if the centroidal longitudinal axes are collinear within 5 degrees.	Left	N/A*		
	Center			
	Right			
Inspect the inside surface of the bar that is straight and horizontal section of the bars, and determine they are not less than 25 mm, but not more than 40 mm in length.	Left	N/A*		
	Center			
	Right			
Inspect if the bars can be connected to, over their entire inside length by the connectors of child restraint system.	Left	N/A*		
	Center			
	Right			
Measure the distance between the center of the length of one bar to the center of the length of the other bar. The requirement is 280 mm \pm 1 mm.	Left	N/A*		
	Center			
	Right			
Inspect if the bars are an integral and permanent part of the vehicle.	Left	N/A*		
	Center			
	Right			
Inspect if the bars are rigidly attached to the vehicle. If feasible, hold the bar firmly with two fingers and gently pull.	Left	N/A*		
	Center			
	Right			

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION			
		FRONT	REAR	THIRD
Optional Marking: At least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking is visible.	Left	N/A*		
	Center			
	Right			
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	Left	N/A*		
	Center			
	Right			

* Driver's seat

NOTE:

15. DATA SHEETS....Continued
DATA SHEET 3
LOCATION AND DIMENSIONAL MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____ ; OBSERVERS: _____

Number of DSPs in Test Vehicle As Stated On Tire Label using Figures For Maximum Vehicle Loading

Front Seat = _____ ; Rear Seat = _____ ; Third Seat = _____ **TOTAL** = _____

SEAT POSITION FOR LOWER ANCHORAGE		PRESENCE OF ANCHORAGES		COMMENTS
		SPECIFIED	OBSERVED	
FRONT	Left	N/A	N/A	Driver's Seat
	Center			
	Right			
REAR	Left			
	Center			
	Right			
THIRD	Left			
	Center			
	Right			

SEAT POSITION FOR LOWER ANCHORAGE		LOCATION OF ANCHORAGE		COMMENTS
		MEASURED FROM "Z" (mm)	MEASURED FROM "SRP" (mm)	
FRONT	Left	N/A	N/A	Driver's Seat
	Center			
	Right			
REAR	Left			
	Center			
	Right			
THIRD	Left			
	Center			
	Right			

NOTE:

15. DATA SHEETS....Continued

REMARKS:

RECORDED BY: _____

DATE: _____

APPROVED BY: _____

DATA SHEET 4
ANCHORAGE STATIC LOADING

RESERVED

15. DATA SHEETS....Continued**DATA SHEET 5**

ANCHORAGE STATIC LOADING

RESERVED

RECORDED BY: _____

DATE: _____

APPROVED BY: _____

15. DATA SHEETS....Continued

DATA SHEET 6 ANCHORAGE STATIC LOADING

VEH. MOD YR/MAKE/MODEL/BODY: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____

OBSERVERS: _____

Lower Anchorage - Forward force application

SEATING POSITION		Seat, Seat Back & Head Restraint Positions			Measured Angles		Initial Location	Onset Rate	Force Applied	Final Location	Displacement
		Seat	Seat Back	Head Restraint	Vertical	Horizontal					
FRONT	Left (Driver)										
	Center										
	Right										
REAR	Left										
	Center										
	Right (if any)										
THIRD	Left										
	Center										
	Right										

15. DATA SHEETS....Continued

DATA SHEET 7 ANCHORAGE STATIC LOADING LOAD

VEH. MOD YR/MAKE/MODEL/BODY: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____

OBSERVERS: _____

Lower Anchorage -Lateral force application

SEATING POSITION		Seat, Seat Back & Head Restraint Positions			Measured Angles			Initial Location	Onset Rate	Force Applied	Final Location	Displacement
		Seat	Seat Back	Head Restraint	Horizontal	Vertical						
						Left	Right					
FRONT	Left (Driver)											
	Center											
	Right											
REAR	Left											
	Center											
	Right (if any)											
THIRD	Left											
	Center											
	Right											

REMARKS:

RECORDED BY: _____

DATE: _____

APPROVED BY: _____

15. DATA SHEETS....Continued**DATA SHEET 8**
TEST VEHICLE RECEIVING-INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____

OBSERVERS: _____

1. First compliance test by laboratory for this vehicle is **S225** test.☐ Yes ☐ No (Go to item 2)☐ 1.1 Label test vehicle with NHTSA Number☐ 1.2 Verify all options on the "window sticker" are present on the vehicle☐ 1.3 Verify tires and wheel rims are new and the same as listed☐ 1.4 Verify there are no dents or other interior or exterior flaws☐ 1.5 Verify the glove box contains an owner's manual, warranty document, consumer information, and extra keys☐ 1.6 Verify the vehicle is equipped with the proper fuel filler cap☐ 1.7 If the vehicle has been delivered from the dealer, verify the vehicle has been properly prepared and is in running condition

2. Verify seat adjusters are working

☐ Yes ☐ No

3. Verify there is a seat belt at each seating position

☐ Yes ☐ No

15. DATA SHEETS....Continued

4. Without disturbing the integrity of each seat belt and anchorage, verify that each seat belt is attached to the anchorage. For seat belts that are attached to the seat, also verify the seats are attached to the seat anchors and the seat anchors are attached to the vehicle.

___ Yes ___ No

5. REMARKS: (Explain any problems here)

RECORDED BY: _____

DATE: _____

APPROVED BY: _____

16. FORMS

LABORATORY NOTICE OF TEST FAILURE TO OVSC

FMVSS NO.: **225**

TEST DATE: _____

LABORATORY: _____

CONTRACT NO.: DTNH22-_____ ; DELV. ORDER NO.: _____

LABORATORY PROJECT ENGINEER'S NAME: _____

TEST VEHICLE MAKE/MODEL/BODY STYLE: _____

VEHICLE NHTSA NO.: _____ ; VIN: _____

VEHICLE MODEL YEAR: _____ ; BUILD DATE: _____

TEST FAILURE DESCRIPTION: _____

S225 REQUIREMENT, PARAGRAPH ____ : _____

NOTIFICATION TO NHTSA (COTR): _____

DATE: _____ BY: _____

REMARKS:

16. FORMS....Continued

MONTHLY TEST STATUS REPORT
FMVSS 225

DATE OF REPORT: ____ / ____ / ____

No.	VEHICLE NHTSA No., MAKE & MODEL	COMPLIANCE TEST DATE	PASS/ FAIL	DATE REPORT SUBMITTED	DATE INVOICE SUBMITTED	INVOICE PAYMENT DATE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

16. REPORT FORMS....Continued

MONTHLY VEHICLE STATUS REPORT
FMVSS 225

DATE OF REPORT: _____

No.	VEHICLE NHTSA No., MAKE & MODEL	DATE OF DELIVERY	TEST COMPLETE DATE	VEHICLE SHIPMENT DATE	CONDITION OF VEHICLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

APPENDIX A. Electronic Data Submission Instruction

An electronic data submission (data tape), formatted in accordance with the NHTSA R&D Data Reference Guide, Volume III: Component Tests V5, will be required for each test conducted for OVSC. Copied of the guide may be downloaded from the web site, "<http://www-nrd.nhtsa.dot.gov/nrd10/software/TestRefGuides/guides.html>."

The ENTREEW V5 application software provides a comprehensive graphical user interface for the generation of the compliance test data sets defined in the Component Tests V5 guide, and may be downloaded from <http://www-nrd.nhtsa.dot.gov/nrd10/software/entree/index.html>."

Each submission shall include the raw sensor outputs measured to determine compliance to the standard, such as force, displacement, etc., but computed signals, such as components are not required.

Any questions concerning preparation of the electronic data submission should be directed to:

Barbara Hennessey
US/DOT
NHTSA/NRD11
400 Seventh Street, SW
Washington, DC 20590
PH: 202-366-4714
FX: 202-366-5670

e-mail: barbara.hennessey@nhtsa.dot.gov

Appendix B